The WSIPP benefit-cost analysis examines, on an apples-to-apples basis, the monetary value of programs or policies to determine whether the benefits from the program exceed its costs. WSIPP's research approach to identifying evidence-based programs and policies has three main steps. First, we determine "what works" (and what does not work) to improve outcomes using a statistical technique called meta-analysis. Second, we calculate whether the benefits of a program exceed its costs. Third, we estimate the risk of investing in a program by testing the sensitivity of our results. For more detail on our methods, see our technical documentation.

Current estimates replace old estimates. Numbers will change over time as a result of model inputs and monetization methods.

School-wide positive behavior programs

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Some K–12 schools operate school-wide student behavior improvement programs as one way to focus the school environment on learning (rather than discipline or other issues). These programs are often described as "positive behavior" interventions or systems and include specific programs such as School-wide Positive Behavioral Interventions and Supports, Positive Action, and the Responsive Classroom. The programs encourage pro-social behavior for all students. (In contrast, other interventions target problem behaviors among troubled students who are not the focus of this analysis.) School-wide behavior programs typically include a specialized curriculum, professional development for teachers and staff, and encouragement of and rewards for positive behaviors such as being on time and listening in the classroom.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$14,892	Benefit to cost ratio	$143.98
Taxpayers	$7,631	Benefits minus costs	$31,521
Other (1)	$8,700	Probability of a positive net present value	99 %
Other (2)	$518		
Total	$31,741		
Costs	($221)		
Benefits minus cost	$31,521		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$584	$1,684	$294	$2,562
Labor market earnings (test scores)	$14,957	$6,380	$7,393	$0	$28,731
K-12 grade repetition	$0	$157	$0	$79	$235
Health care (educational attainment)	($65)	$510	($377)	$257	$325
Adjustment for deadweight cost of program	$0	$0	$0	($111)	($111)
Totals	$14,892	$7,631	$8,700	$518	$31,741

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
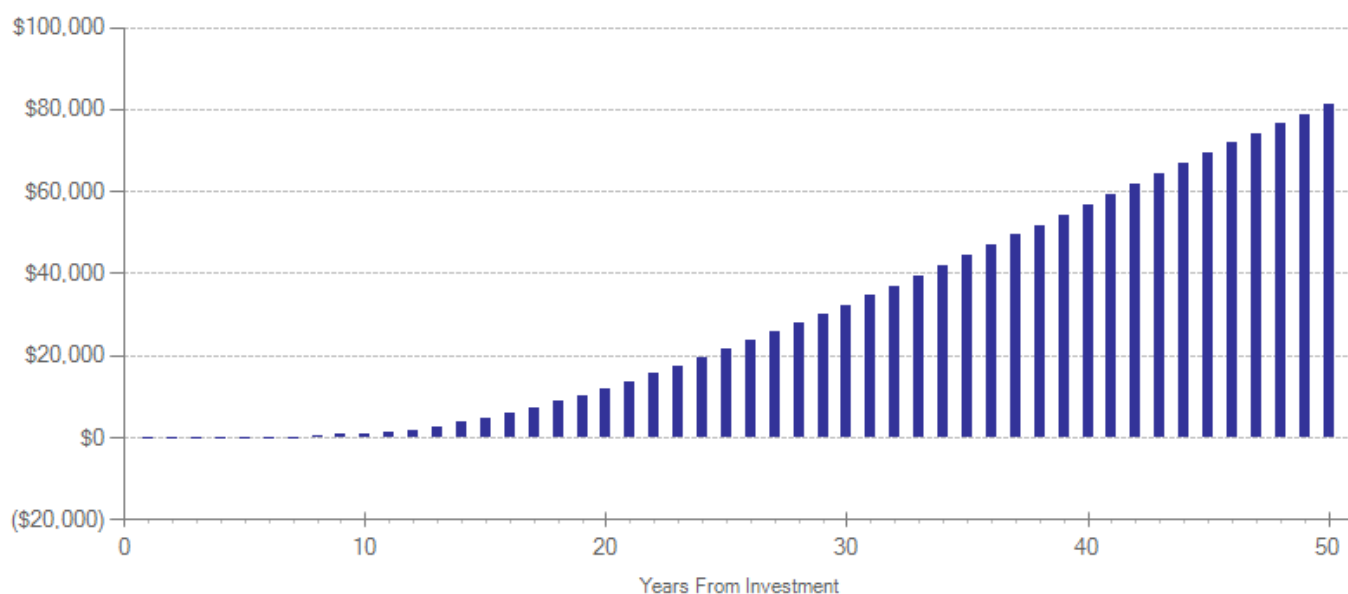
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$221	1	2013	Present value of net program costs (in 2013 dollars)	($221)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

Costs are WSIPP estimates based on a model for the total cost for implementation as described in Blonigen, B.A., Harbaugh, W.T., Singell, L.D., Horner, R.H., Irvin, L.K., & Smolkowski, K.S. (2008). Application of economic analysis to school-wide positive behavior support (SWPBS) programs. *Journal of Positive Behavior Interventions, 10*(1), 5-19. The cost estimate assumes district-wide implementation of a positive behavior program in ten schools. We calculate the value of staff time using average Washington State compensation costs (including benefits) as reported by the Office of the Superintendent of Public Instruction. To calculate a per-student annual cost, we use the average number of students per school in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	7	0.452	0.001	0.403	0.103	9	0.242	0.113	17
Crime	Primary	2	-0.644	0.001	-0.148	0.054	9	-0.148	0.054	19
K-12 grade repetition	Primary	1	-0.307	0.001	-0.307	0.007	9	-0.307	0.007	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.065	0.031	18	0.065	0.031	18
Suspensions/expulsions	Primary	1	-0.318	0.001	-0.318	0.007	9	-0.318	0.007	18

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State and district early childhood education programs

Benefit-cost estimates updated August 2014. Literature review updated December 2013.

Program Description: Pre-kindergarten funded by states or school districts that is universal or targets low-income students.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$15,058	Benefit to cost ratio	$4.76
Taxpayers	$10,375	Benefits minus costs	$26,386
Other (1)	$9,576	Probability of a positive net present value	89 %
Other (2)	($1,586)		
Total	$33,423		
Costs	($7,037)		
Benefits minus cost	$26,386		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1,133	$3,372	$565	$5,071
Labor market earnings (hs grad)	$15,293	$6,523	$7,560	$0	$29,375
K-12 grade repetition	$0	$216	$0	$108	$323
K-12 special education	$0	$662	$0	$330	$992
Health care (educational attainment)	($234)	$1,841	($1,356)	$918	$1,169
Adjustment for deadweight cost of program	$0	$0	$0	($3,508)	($3,508)
Totals	$15,058	$10,375	$9,576	($1,586)	$33,423

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
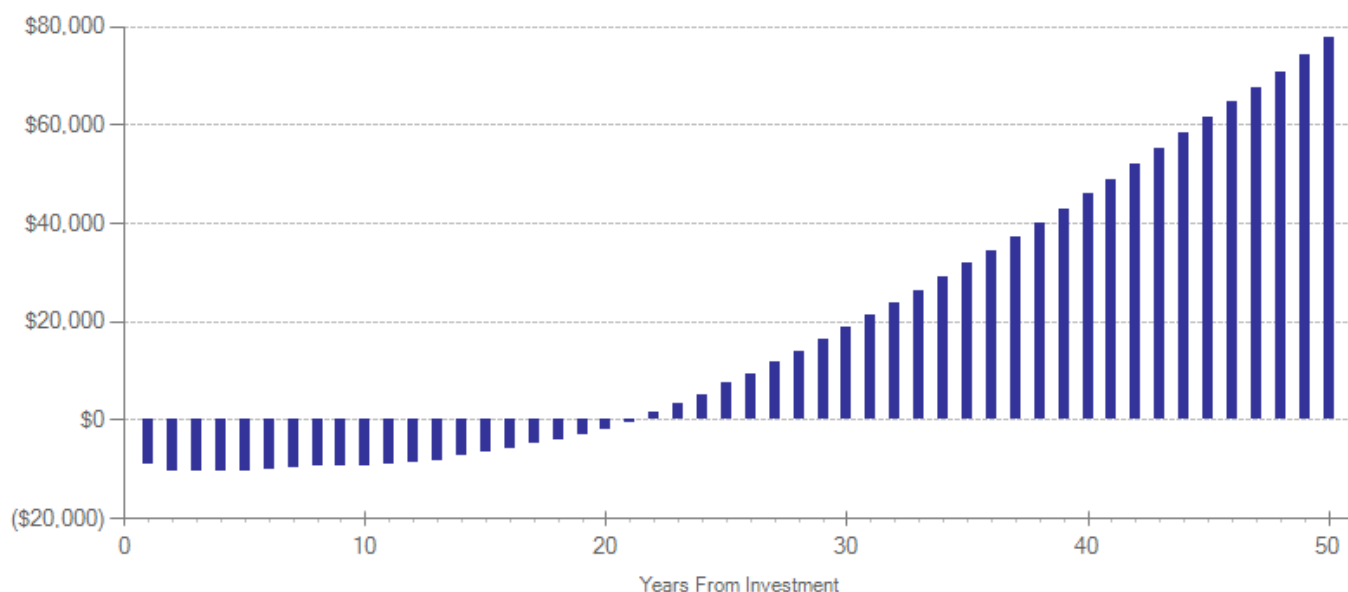
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$6,934	1.17	2012	Present value of net program costs (in 2013 dollars)	($7,037)
Comparison costs	$961	1.17	2012	Uncertainty (+ or - %)	10 %

Total cost of ECEAP program including administration per slot plus the amount of state-subsidized child care subsidies distributed to kids in ECEAP; Comparison group costs were calculated by dividing the amount of state-subsidized child care subsidies distributed to ECEAP-eligible non-ECEAP kids (30,936); The number of eligible students includes all HS students - while HS eligibility is up to 130% of FPL, students under 100% FPL are given first priority; http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	17	0.316	0.001	0.316	0.032	4	0.066	0.007	17
K-12 grade repetition	Primary	4	-0.385	0.001	-0.385	0.090	12	-0.385	0.090	12
K-12 special education	Primary	3	-0.226	0.116	-0.226	0.144	14	-0.226	0.144	14
High school graduation	Primary	2	0.230	0.100	0.230	0.140	18	0.230	0.140	18
Crime	Primary	1	-0.251	0.150	-0.251	0.174	26	-0.251	0.174	36

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Consultant teachers: Literacy Collaborative

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Literacy Collaborative is a comprehensive teacher professional development model that uses coaching for teachers as a primary strategy to improve instructional practices and student outcomes. The program provides up to 35 days of training at university sites to literacy coaches before placement in schools, as well as on-going training and support. Coaches provide professional development and work one-on-one with classroom teachers with a focus on the specific instructional strategies in the Literacy Collaborative model. The evaluation included in this analysis measures the impact of the model on students in grades K–2 after three years of implementation.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$9,706	Benefit to cost ratio	$25.44
Taxpayers	$4,482	Benefits minus costs	$17,836
Other (1)	$4,579	Probability of a positive net present value	89 %
Other (2)	($201)		
Total	$18,566		
Costs	($730)		
Benefits minus cost	$17,836		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

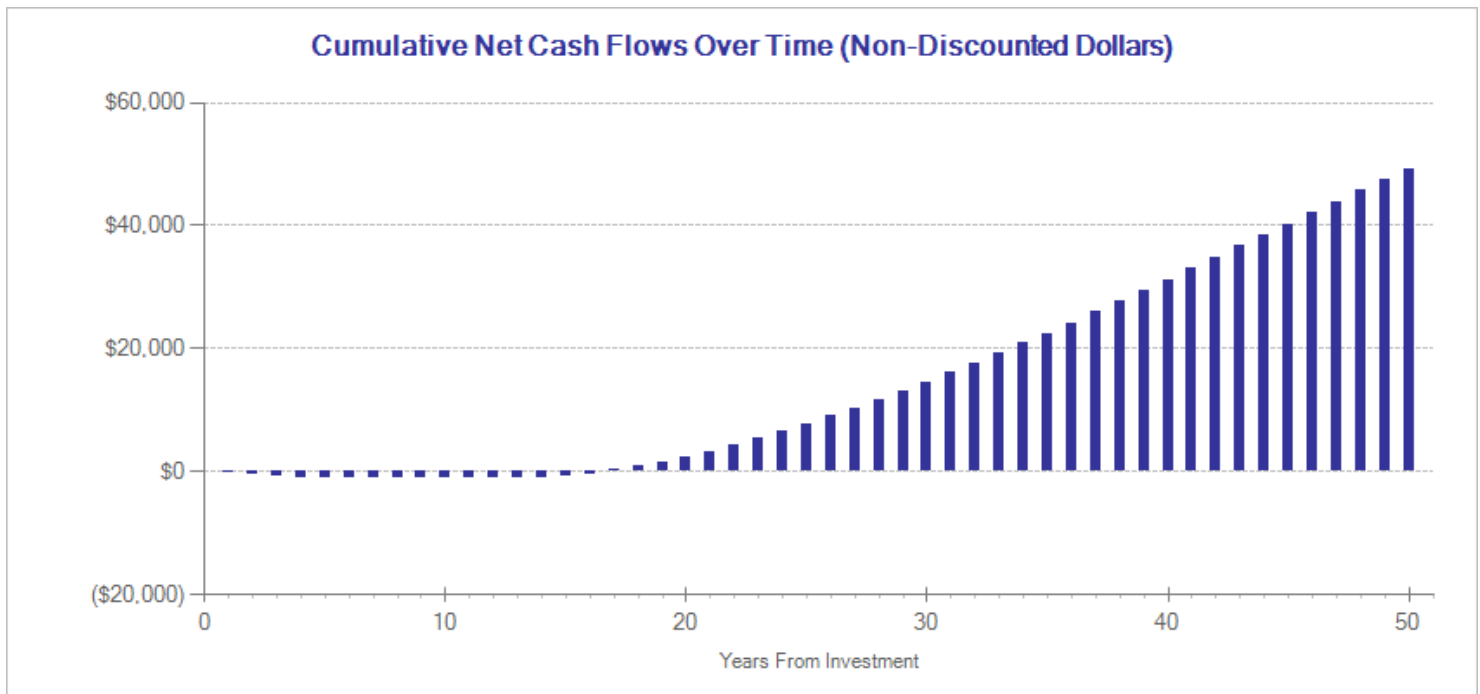| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1	$2	$0	$2
Labor market earnings (test scores)	$9,747	$4,158	$4,816	$0	$18,721
Health care (educational attainment)	($41)	$324	($239)	$161	$205
Adjustment for deadweight cost of program	$0	$0	$0	($363)	($363)
Totals	$9,706	$4,482	$4,579	($201)	$18,566

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$192	4	2013	Present value of net program costs (in 2013 dollars)	($730)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

Cost is a WSIPP estimate based on published literacy coach training costs, including training fees, travel, and materials, from Ohio State University (2014). *Costs for Literacy Collaborative literacy coach training 2014-2015*, Columbus Ohio, OH: author. The estimate also includes salary costs for coach and teacher time based on the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. To calculate a per-student annual cost, we use the number of students in grades K–2 in Washington's prototypical schools formula. Costs reflect the average annual cost per-student assuming three years of implementation and one year of training.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	1	0.428	0.001	0.428	0.119	6	0.171	0.131	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.046	0.035	18	0.046	0.035	18

Citations Used in the Meta-Analysis

Biancarosa, G., Bryk, A.S., & Dexter, E.R. (2010). Assessing the value-added effects of Literacy Collaborative professional development on student learning. *The Elementary School Journal, 111*(1), 7-34.

Head Start

Benefit-cost estimates updated August 2014. Literature review updated December 2013.

Program Description: Head Start is a federal program that funds early childhood education, social services and health services to children ages 0-5. Studies in this analysis focus on center-based Head Start programs for 3- and 4- year olds.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$12,148	Benefit to cost ratio	$2.86
Taxpayers	$7,786	Benefits minus costs	$16,068
Other (1)	$7,847	Probability of a positive net present value	83 %
Other (2)	($3,054)		
Total	$24,728		
Costs	($8,661)		
Benefits minus cost	$16,068		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$925	$2,764	$460	$4,149
Labor market earnings (hs grad)	$12,028	$5,130	$5,948	$0	$23,106
K-12 grade repetition	$0	$50	$0	$25	$75
Public assistance	($3)	$8	$0	$0	$6
Health care (educational attainment)	($187)	$1,466	($1,081)	$729	$926
Subtotals	$11,838	$7,580	$7,630	$1,214	$28,262
From secondary participant					
Crime	$0	$33	$95	$16	$145
Labor market earnings (hs grad)	$299	$128	$148	$0	$574
Child abuse and neglect	$15	$5	$0	$2	$23
Out-of-home placement	$0	$1	$0	$1	$2
K-12 grade repetition	$0	$5	$0	$2	$7
Health care (educational attainment)	($4)	$35	($26)	$17	$22
Subtotals	$310	$207	$217	$39	$773
Adjustment for deadweight cost of program	$0	$0	$0	($4,307)	($4,307)
Totals	$12,148	$7,786	$7,847	($3,054)	$24,728

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
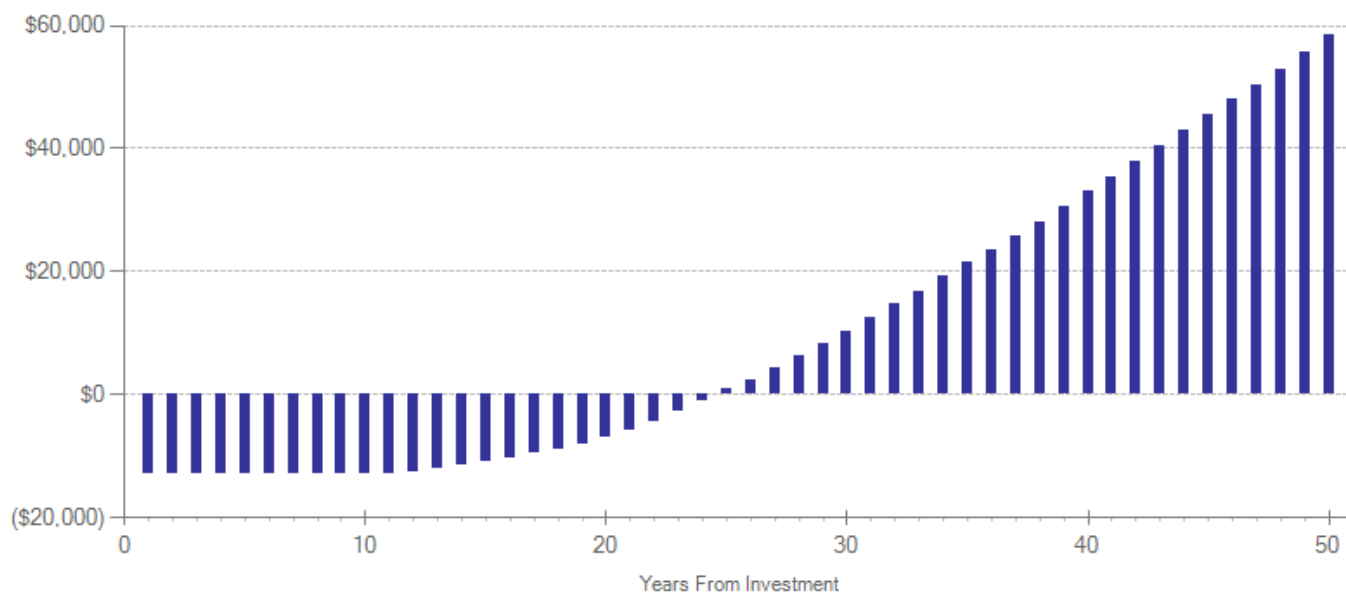
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$9,469	1	2012	Present value of net program costs (in 2013 dollars)	($8,661)
Comparison costs	$903	1	2012	Uncertainty (+ or - %)	10 %

Costs calculated using a weighted average of HS, AIAN HS and MS HScosts including administration per slot; Comparison group costs were calculated by dividing the cost of ECEAP ($55,867,278) by the number of children who are eligible but not served by HS (32,291); The number of eligible students includes all ECEAP students; http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	7	0.172	0.001	0.172	0.027	4	0.036	0.006	17
K-12 grade repetition	Primary	5	-0.075	0.572	-0.075	0.133	12	-0.075	0.133	12
High school graduation	Primary	2	0.181	0.018	0.181	0.077	18	0.181	0.077	18
Crime	Primary	2	-0.183	0.497	-0.183	0.270	21	-0.183	0.270	31
Teen births under age 18	Primary	1	-0.466	0.111	-0.466	0.292	19	-0.466	0.292	19
Teen births (second generation)	Secondary	1	-0.466	0.111	-0.466	0.292	19	-0.466	0.292	19

Citations Used in the Meta-Analysis

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Tutoring: By peers

Benefit-cost estimates updated August 2014. Literature review updated July 2014.

Program Description: Generally, peer tutoring is an instructional strategy that uses students to provide academic assistance to struggling peers. Peer tutoring may use students from the same classrooms or pair older students with younger struggling students. Tutoring assistance can occur through one-on-one interactions or in small groups and in some instances students alternate between the role of tutor and tutee. The specific types of peer tutoring that have been evaluated and are included in this meta-analysis are (in no particular order): ClassWide Peer Tutoring, Peer-Assisted Learning Strategies, and Reciprocal Peer Tutoring. The evaluated tutoring programs in this analysis provide, on average, about 30 hours of peer tutoring time each year and about 6 hours of training time for teachers and students to learn program procedures.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$8,174	Benefit to cost ratio	$143.20
Taxpayers	$3,771	Benefits minus costs	$15,765
Other (1)	$3,853	Probability of a positive net present value	84 %
Other (2)	$78		
Total	$15,876		
Costs	($111)		
Benefits minus cost	$15,765		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

| Source of benefits | Benefits to | | | | |
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1	$1	$0	$2
Labor market earnings (test scores)	$8,208	$3,501	$4,051	$0	$15,760
Health care (educational attainment)	($34)	$270	($200)	$133	$169
Adjustment for deadweight cost of program	$0	$0	$0	($55)	($55)
Totals	$8,174	$3,771	$3,853	$78	$15,876

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
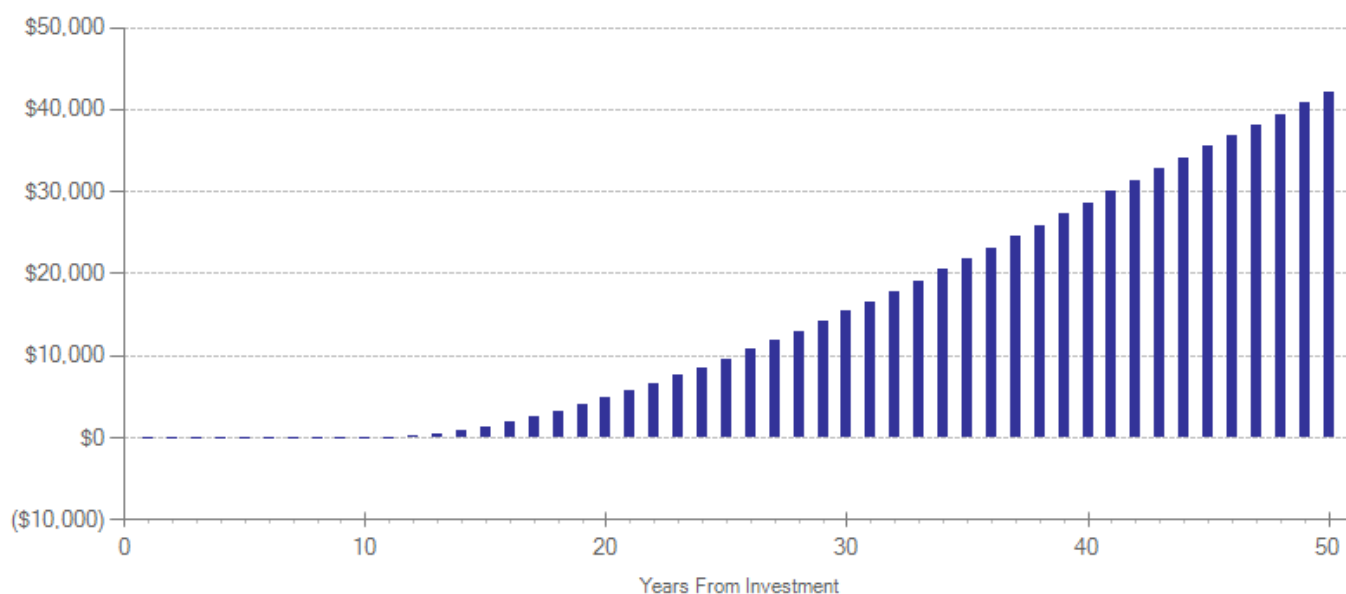
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$111	1	2013	Present value of net program costs (in 2013 dollars)	($111)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in this meta-analysis, the average peer tutoring program provides 30 hours tutoring time and 6 hours of training time per class. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K-8 teacher as reported by the Office of the Superintendent of Public Instruction divided by the number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	8	0.428	0.001	0.217	0.118	9	0.130	0.130	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.035	0.035	18	0.035	0.035	18

Citations Used in the Meta-Analysis

Dion, E., Roux, C., Landry, D., Fuchs, D., Wehby, J., & Dupere, V. (2011). Improving attention and preventing reading difficulties among low-income first-graders: A randomized study. *Prevention Science, 12*(1), 70-79.

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Tutoring: By peers

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Teacher professional development: Use of data to guide instruction
Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: One form of teacher professional development (PD) involves training teachers how to use student academic assessment data to modify and improve instruction. This type of PD is usually paired with computer software that tracks and reports student assessment data to teachers. The specific types of assessments and software that have been evaluated and are included in this meta-analysis are (in no particular order): ISI (Individualized Student Instruction) using A2i software, Data-Driven District (3D), mCLASS/Acuity, Looking at Student Work, Formative Assessments of Student Thinking in Reading (FAST-R), and 4sight.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$6,973	Benefit to cost ratio	$126.97
Taxpayers	$3,221	Benefits minus costs	$13,439
Other (1)	$3,288	Probability of a positive net present value	100 %
Other (2)	$64		
Total	$13,546		
Costs	($107)		
Benefits minus cost	$13,439		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$2
Labor market earnings (test scores)	$7,003	$2,987	$3,459	$0	$13,449
Health care (educational attainment)	($30)	$234	($173)	$117	$149
Adjustment for deadweight cost of program	$0	$0	$0	($54)	($54)
Totals	$6,973	$3,221	$3,288	$64	$13,546

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
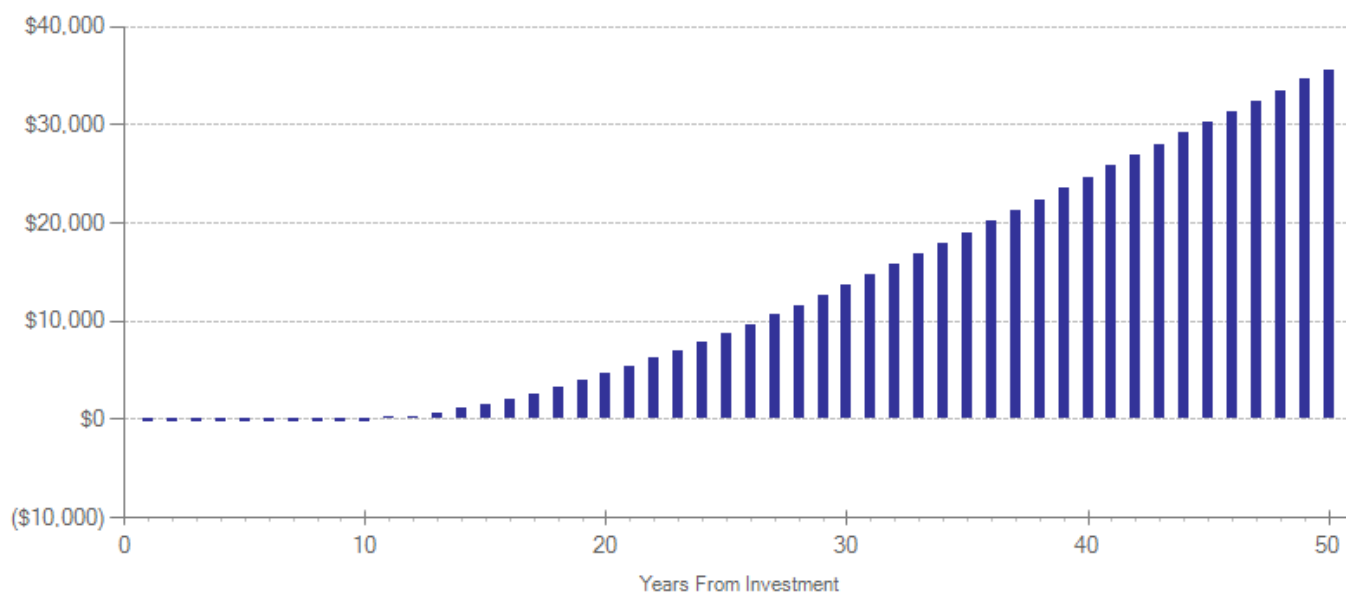
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$107	1	2013	Present value of net program costs (in 2013 dollars)	($107)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 26 hours of training in how to use student assessment data to guide instruction. We calculate the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divide compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	8	0.210	0.001	0.162	0.030	10	0.107	0.033	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.028	0.009	18	0.028	0.009	18

Citations Used in the Meta-Analysis

Al Otaiba, S., Connor, C.M., Folsom, J.S., Greulich, L., Meadows, J., & Li, Z. (2011). Assessment data-informed guidance to individualize kindergarten reading instruction: Findings from a cluster-randomized control field trial. *The Elementary School Journal, 111*(4), 535-560.

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Tyler, J.H. (2013). If you build it will they come? Teachers' online use of student performance data. *Education Finance and Policy, 8*(2), 168-207.

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Consultant teachers: Online coaching

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Online coaching programs provide professional development support and feedback to classroom teachers in a web-based environment. The program included in this analysis (My Teaching Partner – Secondary) provides teachers with feedback and guidance on methods to improve their interactions with students. In the online coaching program, teachers upload video recordings of class sessions twice per month. Trained teacher consultants review the recordings and provide feedback to teachers online and over the phone.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$5,809	Benefit to cost ratio	$58.98
Taxpayers	$2,693	Benefits minus costs	$11,054
Other (1)	$2,737	Probability of a positive net present value	73 %
Other (2)	$6		
Total	$11,245		
Costs	($191)		
Benefits minus cost	$11,054		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

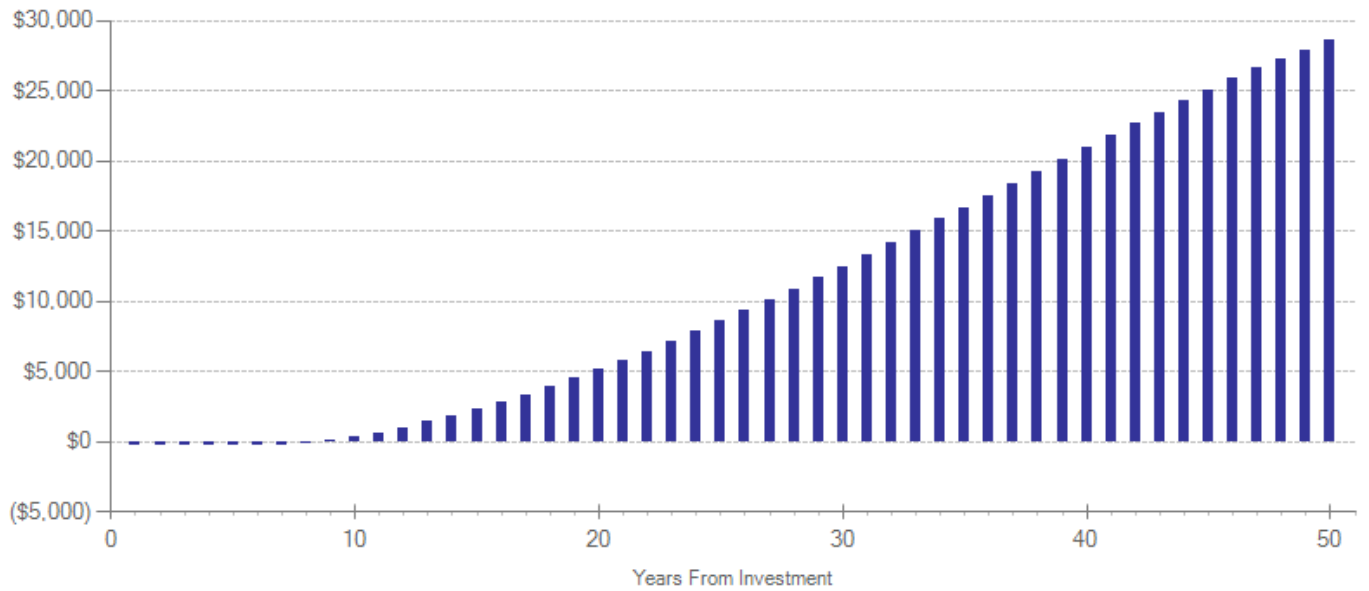| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$2
Labor market earnings (test scores)	$5,835	$2,489	$2,886	$0	$11,210
Health care (educational attainment)	($26)	$203	($150)	$102	$129
Adjustment for deadweight cost of program	$0	$0	$0	($96)	($96)
Totals	$5,809	$2,693	$2,737	$6	$11,245

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$191	1	2013	Present value of net program costs (in 2013 dollars)	($191)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluation included this analysis, teachers participated in an average of 20 hours of training and coaching time. We calculate the value of staff time using average Washington State compensation costs (including benefits) for 8th grade teachers as reported by the Office of the Superintendent of Public Instruction. We add additional costs reported in the evaluation to account for consultant time and video equipment. To calculate a per-student annual cost, we use the average number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Consultant teachers: Online coaching

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	1	0.230	0.061	0.099	0.122	13	0.081	0.134	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.022	0.035	18	0.022	0.035	18

Citations Used in the Meta-Analysis

Allen, J.P., Mikami, A.Y., Pianta, R.C., Gregory, A., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science, 333*(6045), 1034-1037.

Consultant teachers: Online coaching

Summer book programs: Multi-year intervention
Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The summer book program included in this analysis provides 12 free books to elementary students each year for three consecutive years. The program focuses on early elementary students in 1st and 2nd grade. The main goal is to increase book access and voluntary summer reading for children from low-income families. Students self-select books each year at a book fair. The available books are screened for text difficulty.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$5,790	Benefit to cost ratio	$52.94
Taxpayers	$2,687	Benefits minus costs	$10,979
Other (1)	$2,717	Probability of a positive net present value	71 %
Other (2)	($3)		
Total	$11,191		
Costs	($212)		
Benefits minus cost	$10,979		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

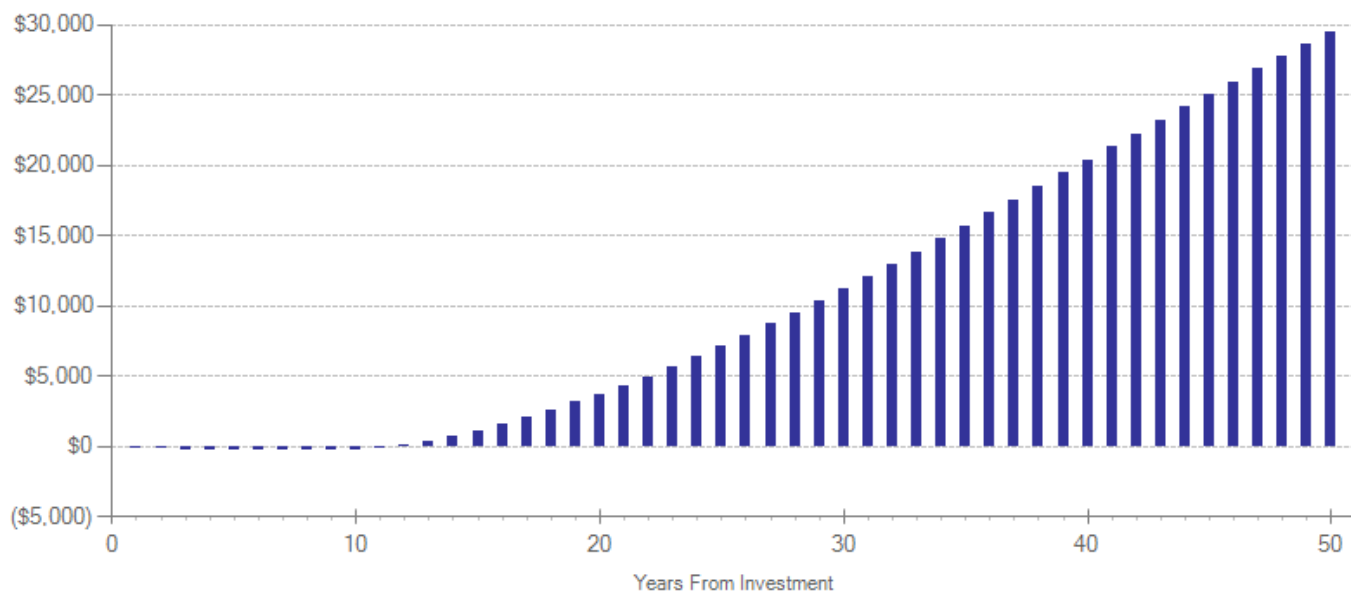| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$2
Labor market earnings (test scores)	$5,817	$2,481	$2,868	$0	$11,166
Health care (educational attainment)	($26)	$206	($152)	$103	$130
Adjustment for deadweight cost of program	$0	$0	$0	($106)	($106)
Totals	$5,790	$2,687	$2,717	($3)	$11,191

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$73	3	2013	Present value of net program costs (in 2013 dollars)	($212)
Comparison costs	$0	3	2013	Uncertainty (+ or - %)	10 %

To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for the time it takes teachers to administer the program. In addition to compensation, the estimate accounts for the cost of purchasing 12 books per student each year.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	1	0.138	0.346	0.138	0.147	10	0.091	0.162	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.025	0.040	18	0.025	0.040	18

Citations Used in the Meta-Analysis

Allington, R. L., McGill-Franzen, A., Camilli, G., Williams, L., Graff, J., Zeig, J., Zmach, C., ... Nowak, R. (2010). Addressing summer reading setback among economically disadvantaged elementary students. *Reading Psychology, 31*(5), 411-27.

Summer book programs: Multi-year intervention

Tutoring: By certificated teachers, small-group, structured
Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The small-group tutoring programs included in this analysis are structured, systematic approaches to tutoring struggling students in specific English language arts and/or mathematics skills. The evaluated programs include a variety of specific approaches and curricula such as (in no particular order) Read Aloud, Proactive Reading, Responsive Reading, Leveled Literacy, Spell Read, Corrective Reading, and Number Rockets. An average program provides about 40 hours of tutoring time to groups of two to six (usually three) early elementary students. Certificated teachers provide tutoring and receive about 35 hours of training with a focus on the specific content and strategies used in the programs.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$6,107	Benefit to cost ratio	$7.98
Taxpayers	$2,820	Benefits minus costs	$9,804
Other (1)	$2,884	Probability of a positive net present value	96 %
Other (2)	($601)		
Total	$11,211		
Costs	($1,406)		
Benefits minus cost	$9,804		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$2
Labor market earnings (test scores)	$6,133	$2,616	$3,033	$0	$11,782
Health care (educational attainment)	($26)	$203	($150)	$101	$129
Adjustment for deadweight cost of program	$0	$0	$0	($702)	($702)
Totals	$6,107	$2,820	$2,884	($601)	$11,211

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
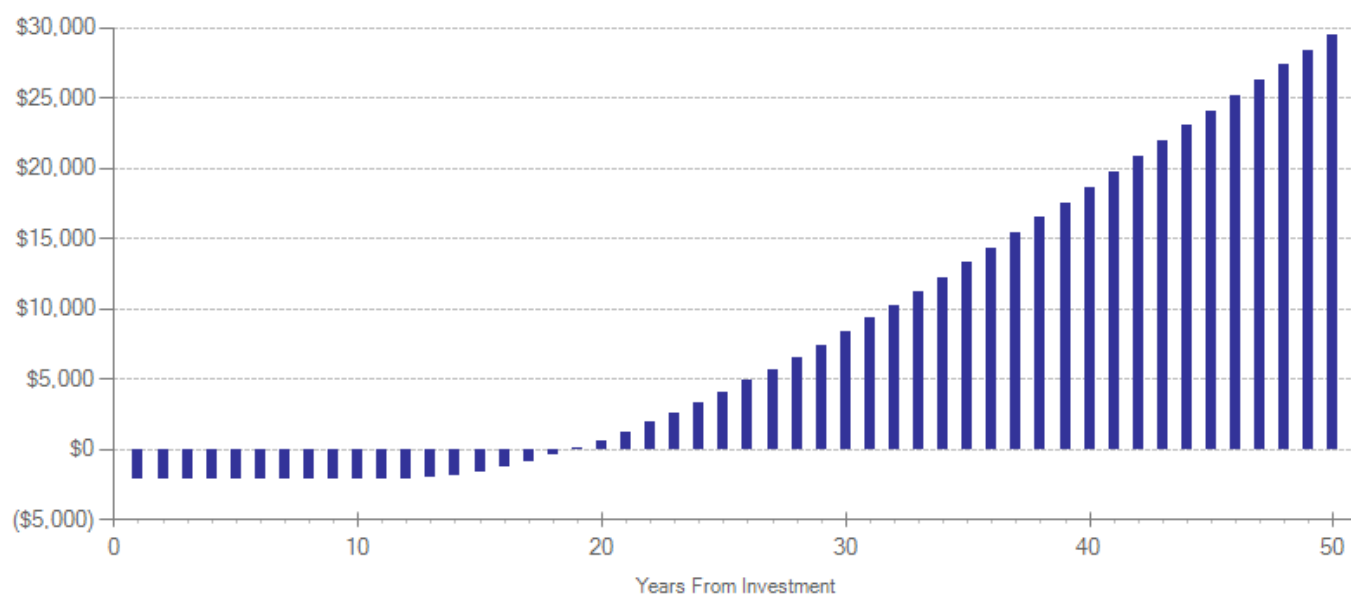
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$1,406	1	2013	Present value of net program costs (in 2013 dollars)	($1,406)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in this meta-analysis, a certificated teacher provides, on average, 40 hours of tutoring to nine students per year in groups of three and receives 35 hours of training. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction, divided by the total number of students served.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	14	0.265	0.001	0.220	0.039	7	0.103	0.043	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.027	0.012	18	0.027	0.012	18

Citations Used in the Meta-Analysis

Fien, H., Santoro, L., Baker, S.K., Park, Y., Chard, D. J., Williams, S., & Haria, P. (2011). Enhancing teacher read alouds with small-group vocabulary instruction for students with low vocabulary in first-grade classrooms. *School Psychology Review, 40*(2), 307-318.

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Pinnell, G.S., Lyons, C. A., DeFord, D.E., Bryk, A.S., & Seltzer, M. (1994). Comparing instructional models for the literacy education of high-risk first graders. *Reading Research Quarterly, 29*(1), 9-39.

Ransford-Kaldon, C.R., Flynt, E.S., Ross, C.L., Franceschini, L., Zoblotsky, T., Huang, Y., & Gallagher, B. (2010). *Implementation of effective intervention: An empirical study to evaluate the efficacy of Fountas & Pinnell's Leveled Literacy Intervention (LLI) 2009-2010.* Memphis, TN: University of Memphis, Center for Research in Education Policy.

Rashotte, C.A., MacPhee, K., & Torgesen, J.K. (2001). The effectiveness of a group reading instruction program with poor readers in multiple grades. *Learning Disability Quarterly, 24*(2), 119-134.

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Torgesen, J.K., Wagner, R.K., Rashotte, C.A., Herron, J., & Lindamood, P. (2010). Computer-assisted instruction to prevent early reading difficulties in students at risk for dyslexia: Outcomes from two instructional approaches. *Annals of Dyslexia, 60*(1), 40-56.

Torgeson, J., Schirm, A., Castner, L., Vartivarian, S., Mansfield, W., Myers, D. ... Haan, C. (2007). National assessment of Title I final report: Volume II: Closing the reading gap: Findings from a randomized trial of four reading interventions for striving readers (NCEE 2008-4013). Washington DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Consultant teachers: Content-Focused Coaching

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Content-Focused Coaching is a professional development model that provides structured training to administrators, coaches, and teachers in order to improve instructional practices and student outcomes. The program provides training for school coaches and principals led by staff from the University of Pittsburgh's Institute for Learning. Coaches, in turn, provide professional development and one-on-one feedback to classroom teachers with a focus on specific reading comprehension strategies. The evaluation included in this analysis compared the effects of Content-Focused Coaching to coaching-as-usual.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$4,125	Benefit to cost ratio	$141.00
Taxpayers	$1,899	Benefits minus costs	$7,957
Other (1)	$1,952	Probability of a positive net present value	68 %
Other (2)	$39		
Total	$8,014		
Costs	($57)		
Benefits minus cost	$7,957		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$1
Labor market earnings (test scores)	$4,142	$1,766	$2,049	$0	$7,957
Health care (educational attainment)	($17)	$132	($98)	$67	$85
Adjustment for deadweight cost of program	$0	$0	$0	($29)	($29)
Totals	$4,125	$1,899	$1,952	$39	$8,014

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
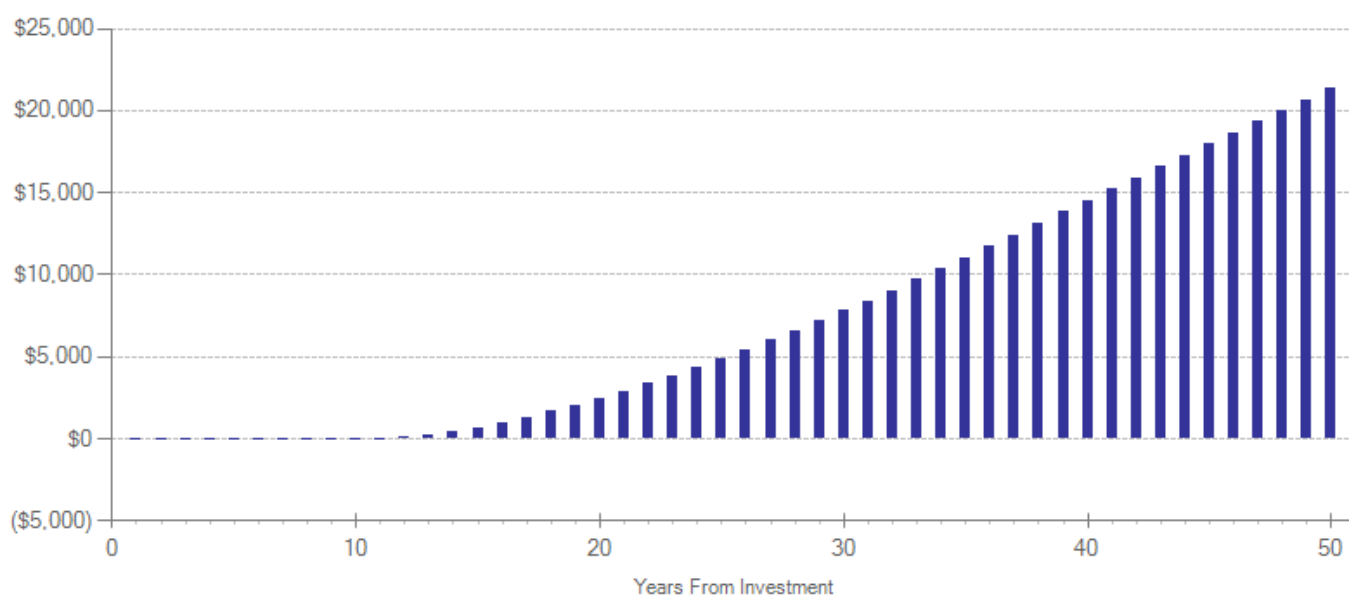
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$299	1	2013	Present value of net program costs (in 2013 dollars)	($57)
Comparison costs	$242	1	2013	Uncertainty (+ or - %)	10 %

Content-Focused Coaching provides additional training time for principals, coaches, and teachers beyond the usual amount of time in other coaching programs. We calculate the cost of Content-Focused Coaching by adding this additional time to the WSIPP estimate for coaching-as-usual based on the framework described in Knight, D.S. (2012). Assessing the cost of instructional coaching. *Journal of Education Finance, 38*(1), 52-80. The estimate is based on one-full time coach per school at the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. In addition, the estimate includes costs related to administrator time, materials, professional development, and classroom teacher time to work with coaches. To calculate a per-student annual cost, we use the average number of students per school in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	1	0.250	0.056	0.107	0.131	9	0.064	0.144	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.017	0.038	9	0.017	0.038	17

Citations Used in the Meta-Analysis

Matsumura, L.C., Garnier, H.E., & Spybrook, J. (2013). Literacy coaching to improve student reading achievement: A multi-level mediation model. *Learning and Instruction, 25*(1), 35-48.

Tutoring: By adults, one-on-one, structured

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The tutoring programs included in this meta-analysis are structured, systematic approaches to tutoring struggling students in specific English language arts and/or mathematics skills. The evaluated programs include a variety of specific programs and curricula such as (in no particular order) Reading Recovery, Mathematics Recovery, Edmark Reading Program, Howard Street Tutoring, and Early Intervention Program. The programs provide, on average, about 30 hours of tutoring time to an individual student each year. Tutors are typically certificated teachers or specially trained adults (e.g. instructional aides and community volunteers). Tutors receive approximately ten hours of training per year with a focus on the specific content and general tutoring strategies.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$5,688	Benefit to cost ratio	$4.36
Taxpayers	$2,631	Benefits minus costs	$7,667
Other (1)	$2,683	Probability of a positive net present value	87 %
Other (2)	($1,046)		
Total	$9,956		
Costs	($2,290)		
Benefits minus cost	$7,667		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$1
Labor market earnings (test scores)	$5,713	$2,437	$2,825	$0	$10,975
Health care (educational attainment)	($25)	$193	($143)	$96	$122
Adjustment for deadweight cost of program	$0	$0	$0	($1,142)	($1,142)
Totals	$5,688	$2,631	$2,683	($1,046)	$9,956

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
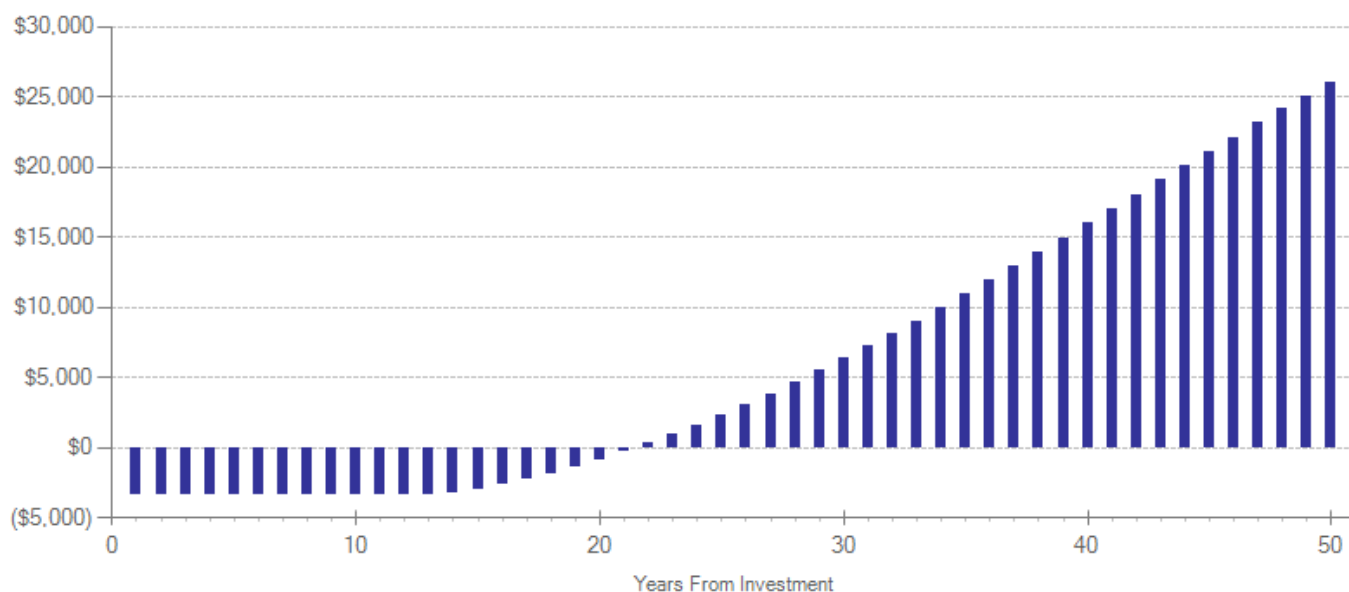
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$2,291	1	2013	Present value of net program costs (in 2013 dollars)	($2,290)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, the average structured one-on-one tutoring program provides 30 hours of intervention per student and ten hours of training time per tutor. The estimates assume that both certificated teachers and other adults (e.g. instructional aides) provide tutoring. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for K–8 teachers and instructional aides as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	24	0.525	0.001	0.206	0.045	7	0.097	0.050	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.026	0.013	18	0.026	0.013	18

Citations Used in the Meta-Analysis

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Special literacy instruction for English language learner students

Benefit-cost estimates updated August 2014. Literature review updated July 2014.

Program Description: English-based literacy programs in these evaluations involve a structured, direct instruction approach to teaching reading to ELL students. Some of the programs are multi-media (e.g., involving computer-based instruction). These programs are compared with literacy instruction-as-usual.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$3,959	Benefit to cost ratio	$26.37
Taxpayers	$1,893	Benefits minus costs	$7,347
Other (1)	$1,835	Probability of a positive net present value	69 %
Other (2)	($49)		
Total	$7,638		
Costs	($291)		
Benefits minus cost	$7,347		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1	$2	$0	$3
Labor market earnings (test scores)	$3,983	$1,699	$1,976	$0	$7,659
Health care (educational attainment)	($25)	$193	($143)	$96	$122
Adjustment for deadweight cost of program	$0	$0	$0	($145)	($145)
Totals	$3,959	$1,893	$1,835	($49)	$7,638

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
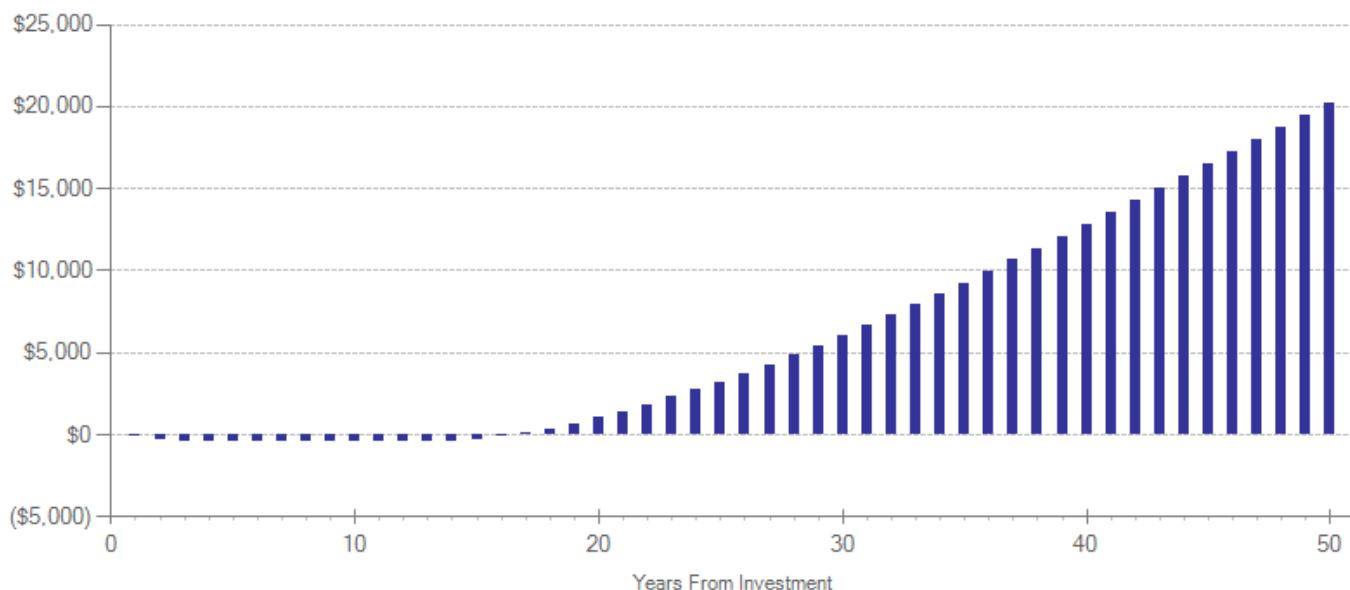
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$1,398	2.8	2009	Present value of net program costs (in 2013 dollars)	($291)
Comparison costs	$1,298	2.8	2009	Uncertainty (+ or - %)	20 %

The cost estimate reflects the sum of local, state, and federal dollars allocated per-student (averaged across Washington State school districts) for the 2008-09 school year. All students who qualify for the state Transitional Bilingual Instructional Program (TBIP) receive some form of services, so the comparison group cost is the same as the program group cost. Because specialized literacy programs may require supplemental materials and training, we added $100 to the cost estimate and increased the uncertainty around the cost estimate to 20 percent. Source for dollars allocated per-student: Office of Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	6	0.312	0.011	0.150	0.123	7	0.071	0.135	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.022	0.042	17	0.022	0.042	17

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Special literacy instruction for English language learner students

Tutoring: By non-certificated adults, small-group, structured

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The small-group tutoring programs included in this analysis are structured, systematic approaches to tutoring struggling students in specific English language arts and/or mathematics skills. The evaluated programs include a variety of specific programs and curricula such as (in no particular order) Quick Reads, Gottshall Early Reading Intervention, and Hot Math. The evaluated tutoring programs provide, on average, 22 hours of tutoring time to groups of two to six (usually three) early elementary students. Tutors are typically instructional aides or college student volunteers who receive 20 hours of training each year. Certificated teachers provide oversight and planning support.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$3,593	Benefit to cost ratio	$12.60
Taxpayers	$1,658	Benefits minus costs	$6,205
Other (1)	$1,699	Probability of a positive net present value	77 %
Other (2)	($209)		
Total	$6,740		
Costs	($536)		
Benefits minus cost	$6,205		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$1
Labor market earnings (test scores)	$3,608	$1,539	$1,786	$0	$6,933
Health care (educational attainment)	($15)	$118	($88)	$59	$75
Adjustment for deadweight cost of program	$0	$0	$0	($269)	($269)
Totals	$3,593	$1,658	$1,699	($209)	$6,740

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
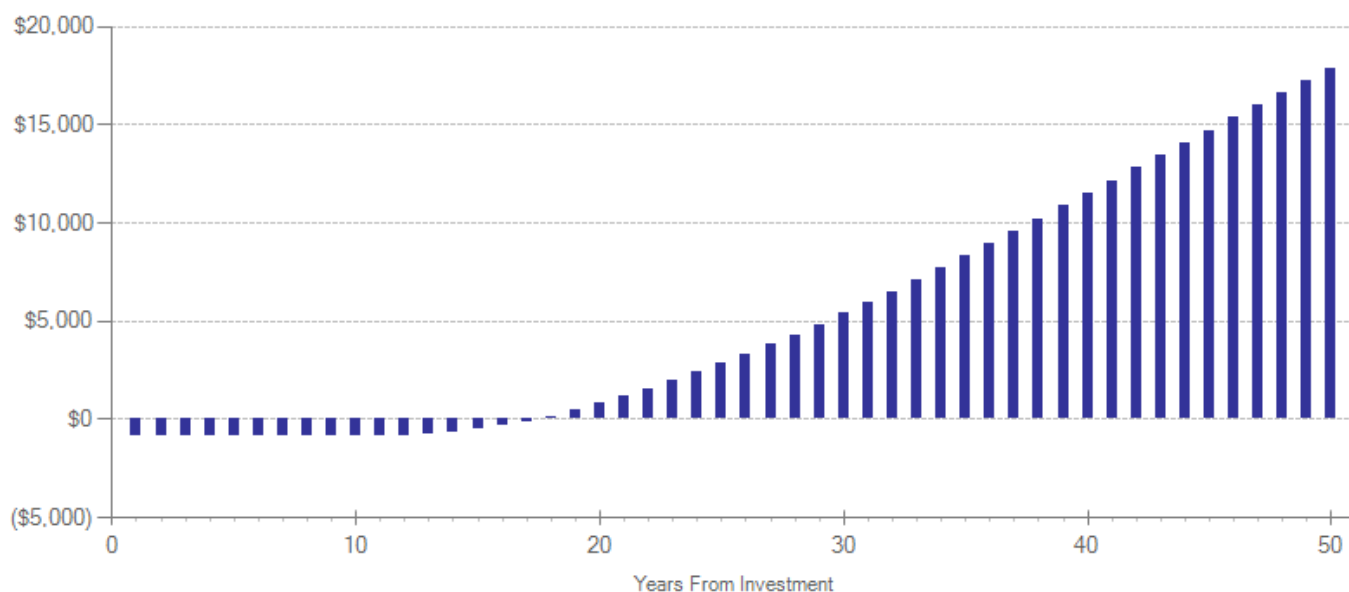
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$536	1	2013	Present value of net program costs (in 2013 dollars)	($536)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in this meta-analysis, a non-certificated adult (such as an instructional aide or college student) provides, on average, 22 hours of tutoring to six students per year in groups of three and receives 20 hours of training. A certificated teacher provides six hours of planning support and oversight per group. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for K–8 teachers and instructional aides as reported by the Office of the Superintendent of Public Instruction, divided by the total number of students served.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	9	0.327	0.001	0.129	0.064	7	0.061	0.070	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.016	0.018	18	0.016	0.018	18

Citations Used in the Meta-Analysis

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Tutoring: By non-certificated adults, small-group, structured

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Tutoring: By adults for English language learner students
Benefit-cost estimates updated August 2014. Literature review updated July 2014.

Program Description: One-on-one tutoring programs for ELL students are analyzed, in comparison with instruction-as-usual for ELL students.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$4,229	Benefit to cost ratio	$5.45
Taxpayers	$2,029	Benefits minus costs	$6,198
Other (1)	$1,949	Probability of a positive net present value	61 %
Other (2)	($600)		
Total	$7,607		
Costs	($1,408)		
Benefits minus cost	$6,198		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

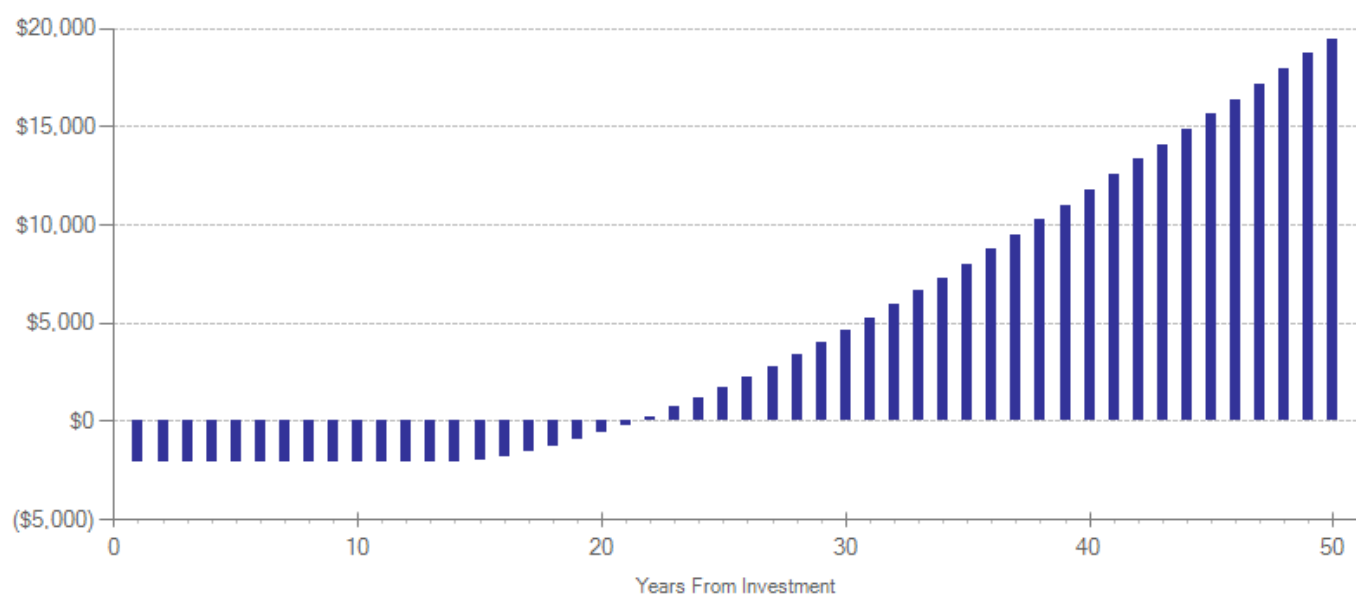| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1	$2	$0	$3
Labor market earnings (test scores)	$4,256	$1,815	$2,104	$0	$8,175
Health care (educational attainment)	($27)	$213	($157)	$107	$136
Adjustment for deadweight cost of program	$0	$0	$0	($708)	($708)
Totals	$4,229	$2,029	$1,949	($600)	$7,607

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$2,612	1	2009	Present value of net program costs (in 2013 dollars)	($1,408)
Comparison costs	$1,298	1	2009	Uncertainty (+ or - %)	20 %

Cost estimates are based on the following assumptions derived from the programs described in the studies included in the meta-analysis: on average, the programs lasted for 4.5 months, with 60 sessions of about 25 minutes each. The programs provide 1 to 3 hours of training. We use average teacher salaries (including benefits) in Washington State to compute the value of tutors' time. We assume that tutoring costs are in addition to regular classroom instruction, for which the cost estimate reflects the sum of local, state, and federal dollars allocated per-student (averaged across Washington State school districts) for the 2008-09 school year. We increased the uncertainty around the cost estimate to 20 percent. Source for dollars allocated per-student: Office of Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	4	0.182	0.264	0.155	0.163	7	0.073	0.179	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.023	0.056	17	0.023	0.056	17

Citations Used in the Meta-Analysis

Calhoon, M. B., Al Otaiba, S., Cihak, D., King, A., & Avalos, A. (2007). Effects of a peer-mediated program on reading skill acquisition for two-way bilingual first-grade classrooms. *Learning Disability Quarterly, 30*(3), 169-184.

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Out-of-school-time tutoring by adults

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The out-of-school time tutoring programs included in this analysis provide one-on-one or small-group tutoring support to underachieving students in English language arts and/or mathematics outside of the regular school day (usually after school). The programs provide, on average, about 40 hours of tutoring time to students each year. Tutors are typically instructional aides or community volunteers who receive approximately ten hours of training.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$3,654	Benefit to cost ratio	$7.29
Taxpayers	$1,689	Benefits minus costs	$5,761
Other (1)	$1,730	Probability of a positive net present value	75 %
Other (2)	($396)		
Total	$6,678		
Costs	($917)		
Benefits minus cost	$5,761		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

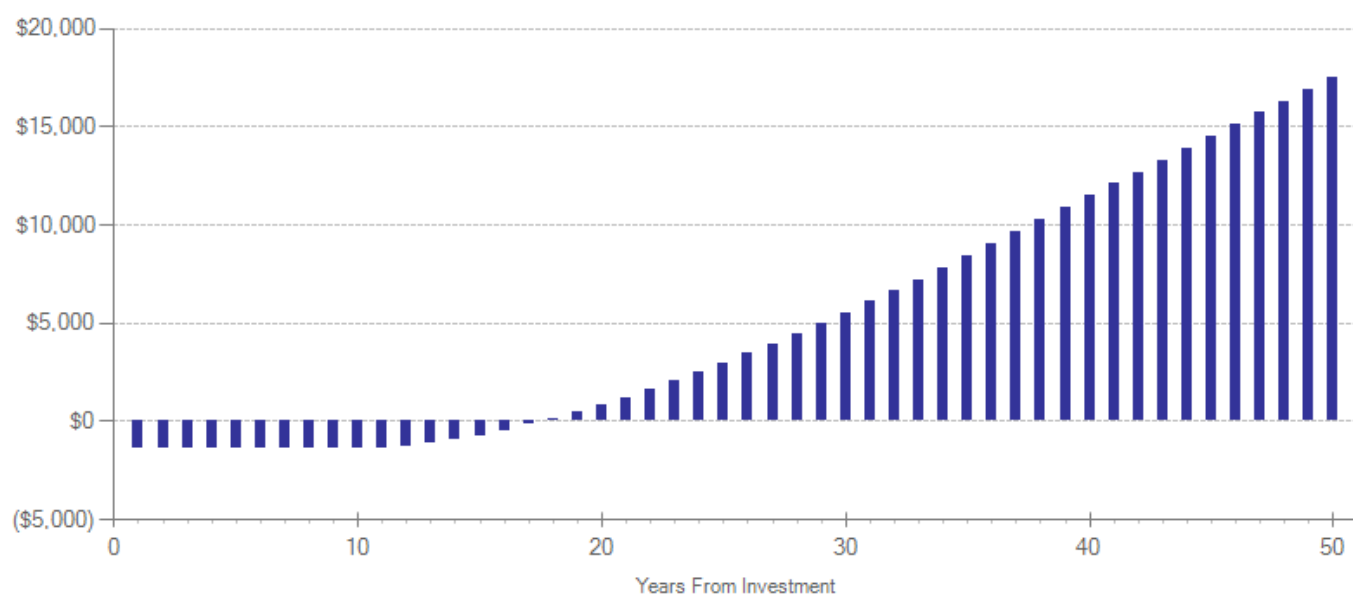| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$1
Labor market earnings (test scores)	$3,670	$1,565	$1,821	$0	$7,056
Health care (educational attainment)	($16)	$124	($92)	$62	$78
Adjustment for deadweight cost of program	$0	$0	$0	($458)	($458)
Totals	$3,654	$1,689	$1,730	($396)	$6,678

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$917	1	2013	Present value of net program costs (in 2013 dollars)	($917)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, the average after-school tutoring program provides 40 hours of intervention and ten hours of training. The cost estimate assumes that adult instructional aides or community volunteers provide tutoring to groups of two students. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for instructional aides as reported by the Office of the Superintendent of Public Instruction and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	6	0.252	0.028	0.099	0.061	9	0.059	0.067	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.016	0.018	18	0.016	0.018	18

Citations Used in the Meta-Analysis

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Case management in schools

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Case management involves placing a full-time social worker or counselor in a school to help identify at-risk students' needs and connect students and families with relevant services in and outside of the K–12 system. Three such models have been evaluated and are included in this analysis (in no particular order): Communities in Schools, City Connects, and Comer School Development Program. In practice, each of these models includes other services (such as extended learning time and educator training), but the program evaluations focus on the impact of the case management component.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$2,650	Benefit to cost ratio	$21.21
Taxpayers	$1,479	Benefits minus costs	$5,005
Other (1)	$1,084	Probability of a positive net present value	66 %
Other (2)	$39		
Total	$5,252		
Costs	($248)		
Benefits minus cost	$5,005		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (hs grad)	$2,692	$1,148	$1,328	$0	$5,169
Property loss (alcohol abuse/dependence)	$0	$0	$0	$0	$0
Health care (educational attainment)	($42)	$331	($244)	$163	$207
Adjustment for deadweight cost of program	$0	$0	$0	($123)	($123)
Totals	$2,650	$1,479	$1,084	$39	$5,252

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
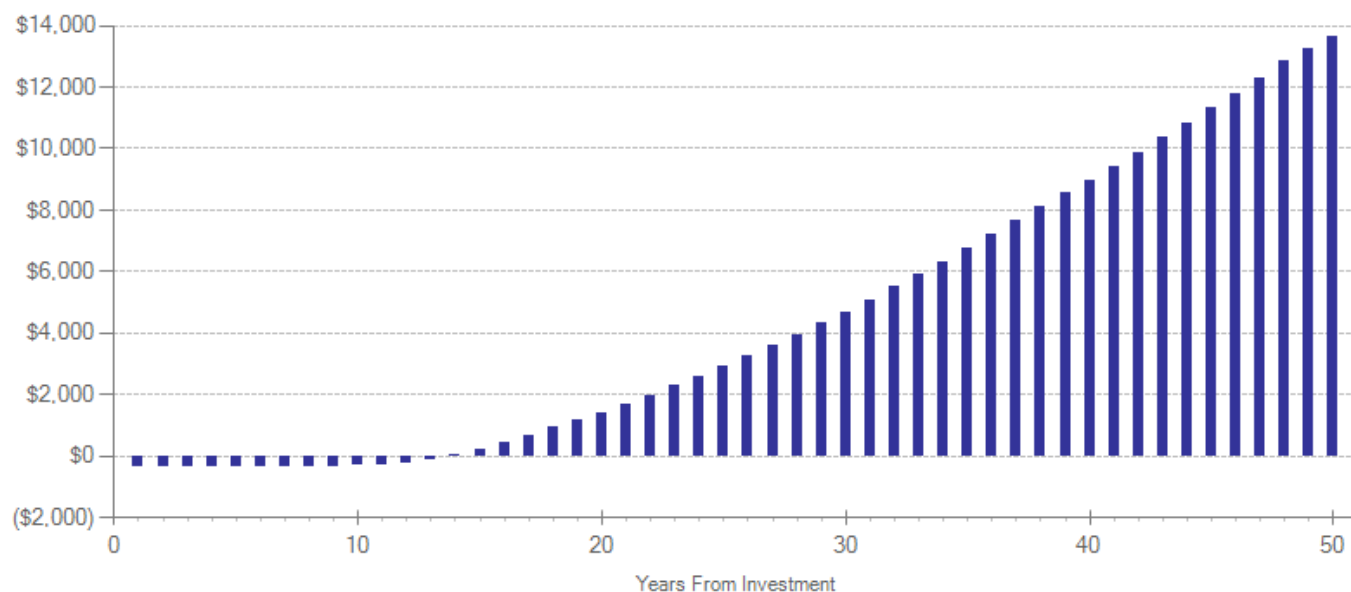
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$248	1	2013	Present value of net program costs (in 2013 dollars)	($248)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

To calculate a per-student annual cost, we use average compensation costs (including benefits) for a social worker as reported by the Office of the Superintendent of Public Instruction, divided by the number of students in a prototypical elementary school and add per-student annual materials, supplies, and operating costs. The estimate also includes a half-hour of principal and administrative support time per week.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Alcohol use before end of middle school	Primary	3	0.032	0.705	0.002	0.085	12	0.002	0.085	18
School attendance	Primary	9	-0.002	0.966	-0.002	0.045	12	0.002	0.054	13
Externalizing behavior symptoms	Primary	1	-0.325	0.044	-0.016	0.161	12	-0.016	0.161	18
Grade point average	Primary	7	0.078	0.238	0.033	0.066	12	0.115	0.148	13
High school graduation	Primary	3	0.048	0.583	0.040	0.089	18	0.040	0.089	18
Internalizing symptoms	Primary	4	-0.030	0.075	-0.002	0.075	12	-0.002	0.075	18
Cannabis use before end of middle school	Primary	3	0.013	0.880	0.001	0.085	12	0.001	0.085	18
Office discipline referrals	Primary	2	0.194	0.192	0.194	0.149	12	0.141	0.162	13
Illicit drug use before end of middle school	Primary	4	-0.034	0.654	-0.002	0.075	12	-0.002	0.075	18
Test scores	Primary	11	0.023	0.533	0.009	0.037	12	0.007	0.041	17
Smoking before end of middle school	Primary	3	0.015	0.862	0.001	0.085	12	0.001	0.085	17

Case management in schools

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Walsh, M., Foley, C., Denny, B.R., Lindsay, L., Coyle, J., & Howard, M. (2011). *The impact of City Connects* (Annual report 2011). Boston: Boston College Center for Optimized Student Support

Teacher professional development: Targeted

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. Targeted PD focuses on improving teaching in a particular content area (such as reading, math, and science) and/or a particular grade level. The specific types of PD evaluated and included in this meta-analysis are (in no particular order): Language Essentials for Teachers of Reading and Spelling (LETRS), Pacific Communities with High Performance in Literacy Development (Pacific CHILD), Cognitively Guided Instruction, Math & Science Partnerships (MSP), Teaching Science, Mathematics and Relevant Technologies (Teaching SMART), Discovery Model Schools Initiative, the Integrated Mathematics Assessment, Teaching Cases, and Metacognitive Analysis. Most forms of targeted PD include a summer institute in addition to training provided during the regular school year.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$2,699	Benefit to cost ratio	$19.79
Taxpayers	$1,247	Benefits minus costs	$4,875
Other (1)	$1,274	Probability of a positive net present value	84 %
Other (2)	($85)		
Total	$5,135		
Costs	($260)		
Benefits minus cost	$4,875		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$1
Labor market earnings (test scores)	$2,710	$1,156	$1,341	$0	$5,207
Health care (educational attainment)	($12)	$91	($67)	$45	$57
Adjustment for deadweight cost of program	$0	$0	$0	($130)	($130)
Totals	$2,699	$1,247	$1,274	($85)	$5,135

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
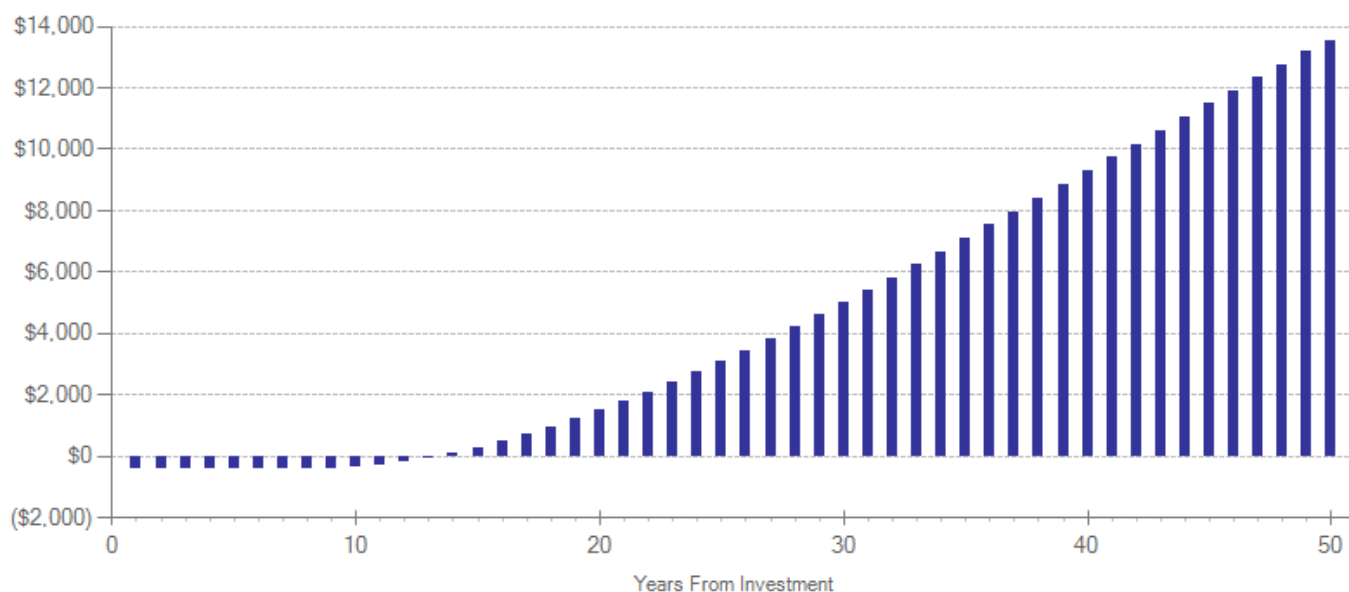
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$260	1	2013	Present value of net program costs (in 2013 dollars)	($260)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 63 additional hours of targeted professional development (PD) in comparison with the usual amount of PD time. We calculate the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divide compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	14	0.158	0.002	0.064	0.035	10	0.042	0.039	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.011	0.010	18	0.011	0.010	18

Citations Used in the Meta-Analysis

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Teacher professional development: Targeted

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Summer learning programs: Academically focused

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: This analysis includes a variety of summer learning programs in which academic improvement is the main goal, often with a focus on remediation and/or prevention of summer learning loss. The programs encompass a range of models and include both community- and school-provided programs. Some programs offer services beyond academic support, such as enrichment and recreation. Based on the studies in this analysis, a typical program lasts about six weeks. This analysis excludes programs that focus on other goals such as general youth development or job training and programs that combine summer learning programs with additional support during the school year.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$3,030	Benefit to cost ratio	$4.73
Taxpayers	$1,400	Benefits minus costs	$4,213
Other (1)	$1,432	Probability of a positive net present value	92 %
Other (2)	($516)		
Total	$5,345		
Costs	($1,132)		
Benefits minus cost	$4,213		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$1	$0	$1
Labor market earnings (test scores)	$3,043	$1,298	$1,506	$0	$5,847
Health care (educational attainment)	($13)	$102	($75)	$51	$65
Adjustment for deadweight cost of program	$0	$0	$0	($567)	($567)
Totals	$3,030	$1,400	$1,432	($516)	$5,345

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
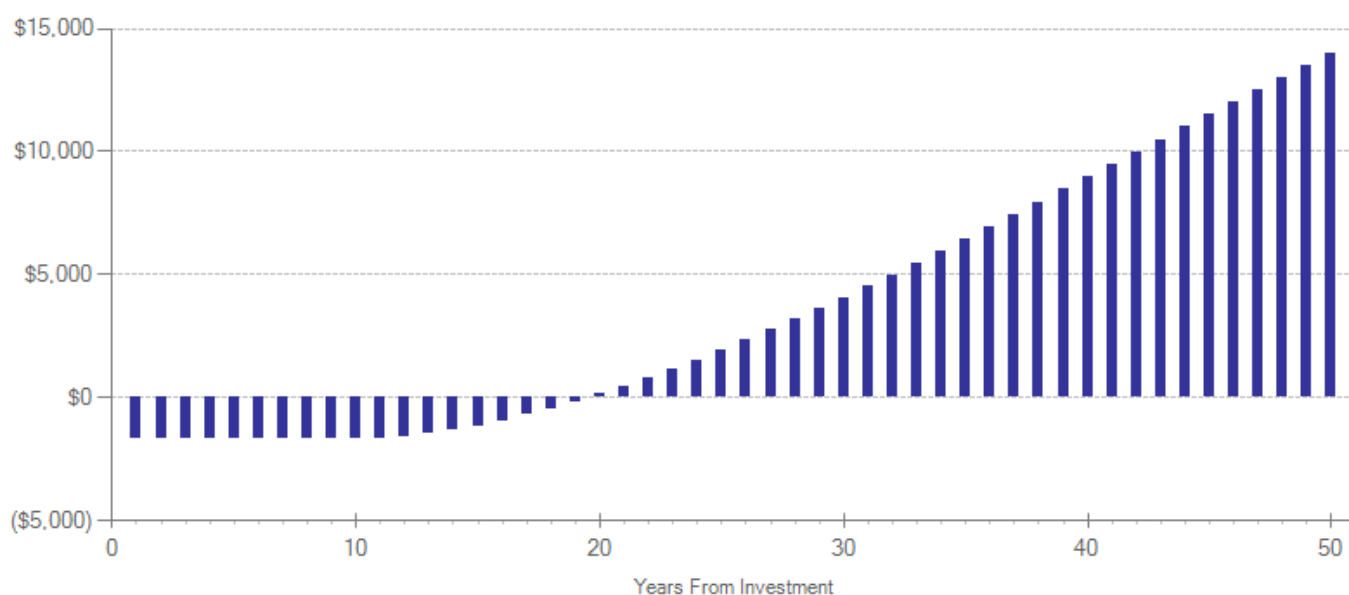
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$1,132	1	2013	Present value of net program costs (in 2013 dollars)	($1,132)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in this meta-analysis, the average summer program included 140 service hours and 40 hours of staff training/planning time. Teachers had, on average, 15 students in each class. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction, divided by the average number of students per class in the evaluated programs. We include per-student annual materials, supplies, and operating costs. The cost estimate provided here does not account for meals or transportation.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	13	0.080	0.001	0.081	0.019	9	0.049	0.021	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.013	0.005	18	0.013	0.005	18

Citations Used in the Meta-Analysis

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Summer learning programs: Academically focused

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Zvoch, K., & Stevens, J. J. (2013). Summer school effects in a randomized field trial. *Early Childhood Research Quarterly, 28*(1), 24-32.

Summer book programs: One-year intervention, with additional support

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The summer book programs included in this analysis provide free books to students paired with additional reading support (e.g., lessons from certified teachers). Generally, the goals of summer book programs include increases in print exposure, the number of books at home, and voluntary reading time. Books are matched to each student's reading level and area of interest and are mailed to students weekly over the summer break. The mailing includes a form for the student to complete after finishing the book. This analysis includes school-based programs only and does not include bookmobiles or public library programs. The studies included in this analysis measure the program's impact after one summer.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,900	Benefit to cost ratio	$32.12
Taxpayers	$881	Benefits minus costs	$3,536
Other (1)	$892	Probability of a positive net present value	60 %
Other (2)	($23)		
Total	$3,650		
Costs	($114)		
Benefits minus cost	$3,536		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$1
Labor market earnings (test scores)	$1,908	$814	$941	$0	$3,663
Health care (educational attainment)	($9)	$67	($49)	$34	$43
Adjustment for deadweight cost of program	$0	$0	$0	($57)	($57)
Totals	$1,900	$881	$892	($23)	$3,650

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
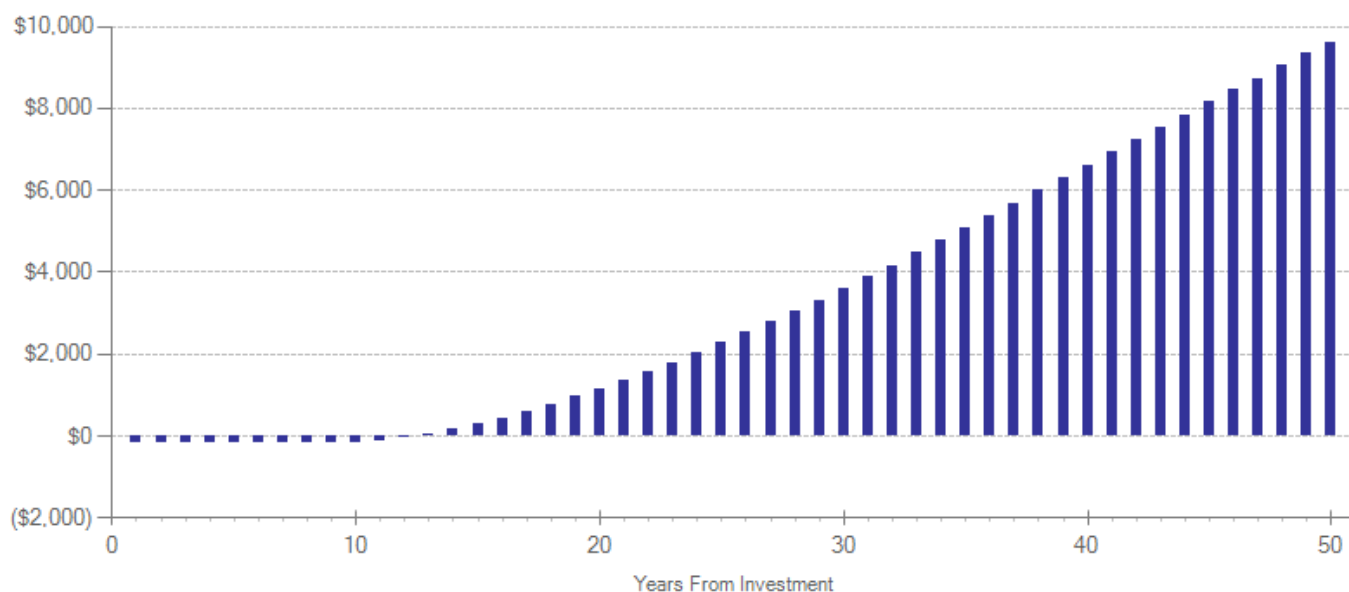
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$114	1	2013	Present value of net program costs (in 2013 dollars)	($114)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for class time and time to administer the program. In addition to compensation, the estimate accounts for the cost of purchasing and shipping ten books to each student's home. The costs do not include parent time for involvement in reading instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	4	0.079	0.455	0.044	0.106	10	0.029	0.117	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.008	0.028	18	0.008	0.028	18

Citations Used in the Meta-Analysis

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Consultant teachers: Coaching

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Coaching is a form of job-embedded professional development for teachers. Coaching programs (sometimes called literacy coaching, mathematics coaching, instructional coaching, or other terms) typically assign a full-time, trained teacher to an individual school to serve as a coach. Generally, coaches work directly with classroom teachers (usually one-on-one or in small groups) to help them improve their instructional strategies. Coaches observe teaching, provide individual feedback, engage in co-teaching sessions, model effective instructional practices, and provide professional development workshops.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,836	Benefit to cost ratio	$13.72
Taxpayers	$847	Benefits minus costs	$3,203
Other (1)	$866	Probability of a positive net present value	86 %
Other (2)	($95)		
Total	$3,455		
Costs	($252)		
Benefits minus cost	$3,203		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$1,844	$787	$911	$0	$3,541
Health care (educational attainment)	($8)	$61	($45)	$30	$38
Adjustment for deadweight cost of program	$0	$0	$0	($126)	($126)
Totals	$1,836	$847	$866	($95)	$3,455

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
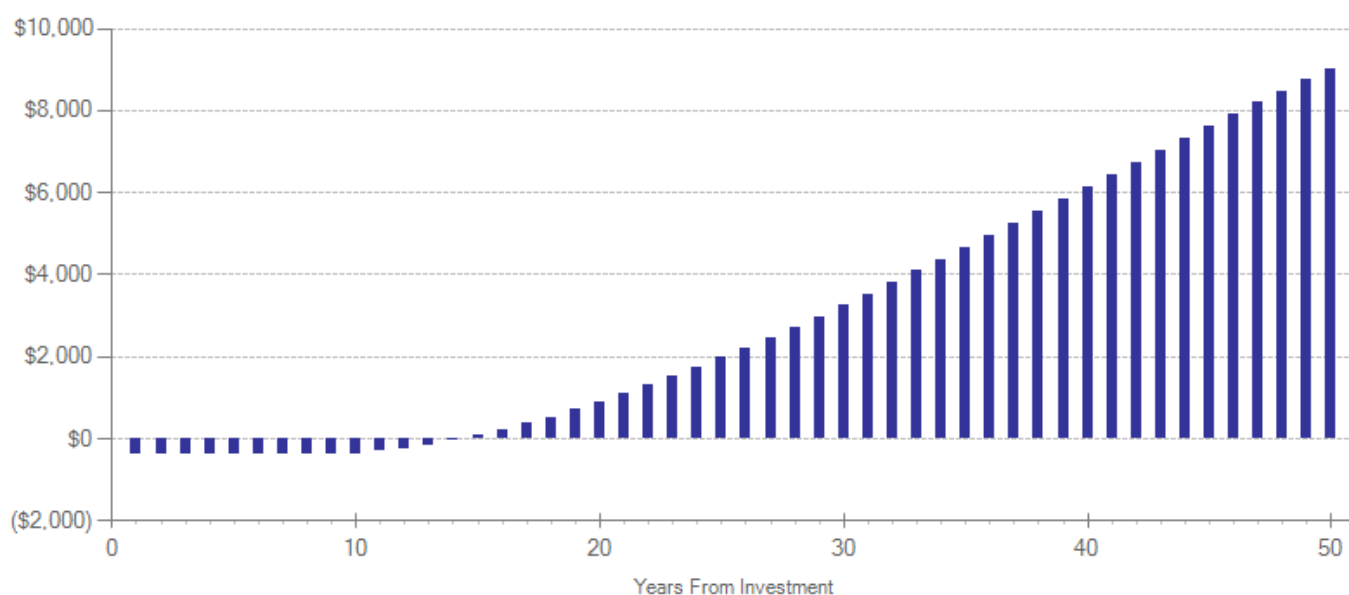
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$252	1	2013	Present value of net program costs (in 2013 dollars)	($252)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

The cost is a WSIPP estimate based on the framework described in Knight, D.S. (2012). Assessing the cost of instructional coaching. *Journal of Education Finance, 38*(1), 52-80. The estimate is based on one-full time coach per school at the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. In addition, the estimate includes costs related to administrator time, materials, professional development, and classroom teacher time to work with coaches. To calculate a per-student annual cost, we use the average number of students per school in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	11	0.042	0.049	0.042	0.021	10	0.028	0.023	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.007	0.006	18	0.007	0.006	18

Citations Used in the Meta-Analysis

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Consultant teachers: Coaching

Teacher professional development: Induction/mentoring
Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Teacher induction programs typically assign an experienced teacher mentor to new teachers in the first and second year of their careers. In more intensive programs, additional support includes professional development opportunities and structured collaboration time with other teachers at the school. The evaluations included in the meta-analysis examine more-intensive programs in comparison with less-intensive programs.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,167	Benefit to cost ratio	$30.26
Taxpayers	$541	Benefits minus costs	$2,164
Other (1)	$547	Probability of a positive net present value	60 %
Other (2)	($17)		
Total	$2,238		
Costs	($74)		
Benefits minus cost	$2,164		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

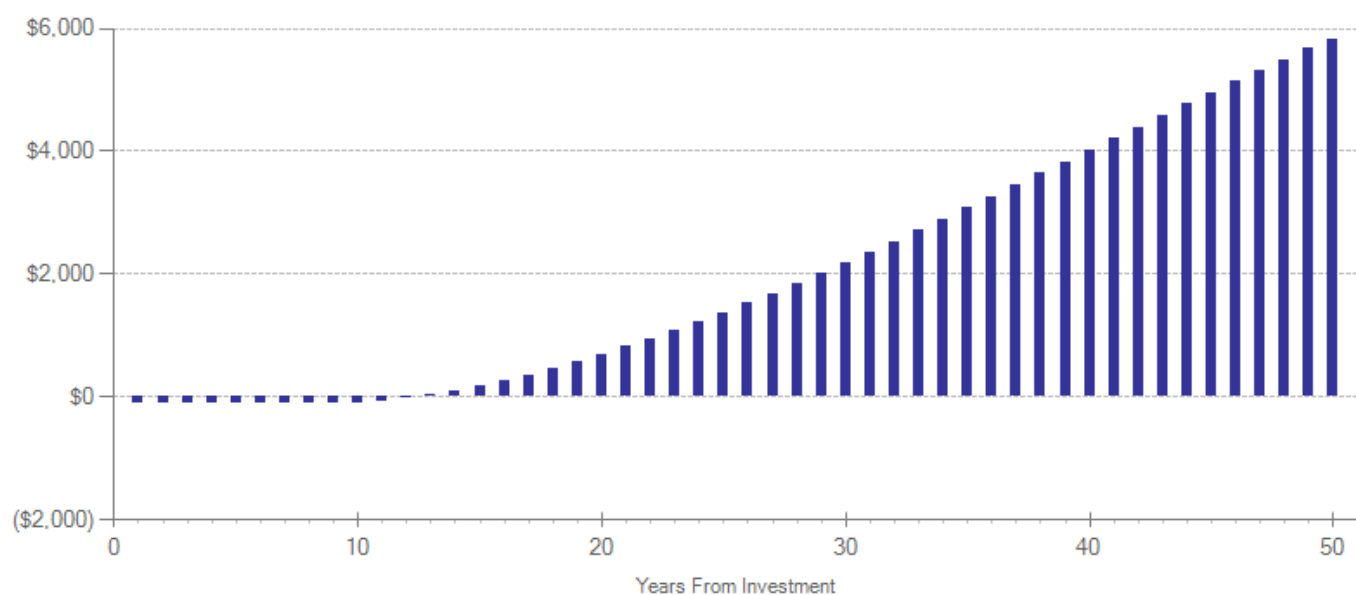| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$1,173	$500	$577	$0	$2,249
Health care (educational attainment)	($5)	$41	($30)	$20	$26
Adjustment for deadweight cost of program	$0	$0	$0	($37)	($37)
Totals	$1,167	$541	$547	($17)	$2,238

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$106	1	2013	Present value of net program costs (in 2013 dollars)	($74)
Comparison costs	$29	1	2009	Uncertainty (+ or - %)	20 %

The cost estimate for the treatment group—those receiving more intensive mentoring—is based on Washington State's per-first-year teacher allocation for the Beginning Educator Support Team (BEST) program in FY 2013. The cost estimate for the comparison group is the FY 2009 per-teacher allocation for the Teacher Assistance Program (TAP) in Washington State. Each of these estimates is divided by the number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	4	0.027	0.653	0.027	0.060	10	0.018	0.066	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.005	0.017	18	0.005	0.017	18

Citations Used in the Meta-Analysis

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Parents as tutors with teacher oversight

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: In "parents as tutors" programs, teachers meet with parents in person and maintain contact over the phone to train and encourage parents to engage in planned, structured academic activities with their children at home, usually in the form of one-on-one reading tutoring. This review does not include the impact on children's academic achievement from parent involvement in general; only school-based programs are included.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,702	Benefit to cost ratio	$3.70
Taxpayers	$789	Benefits minus costs	$2,139
Other (1)	$809	Probability of a positive net present value	55 %
Other (2)	($367)		
Total	$2,933		
Costs	($794)		
Benefits minus cost	$2,139		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

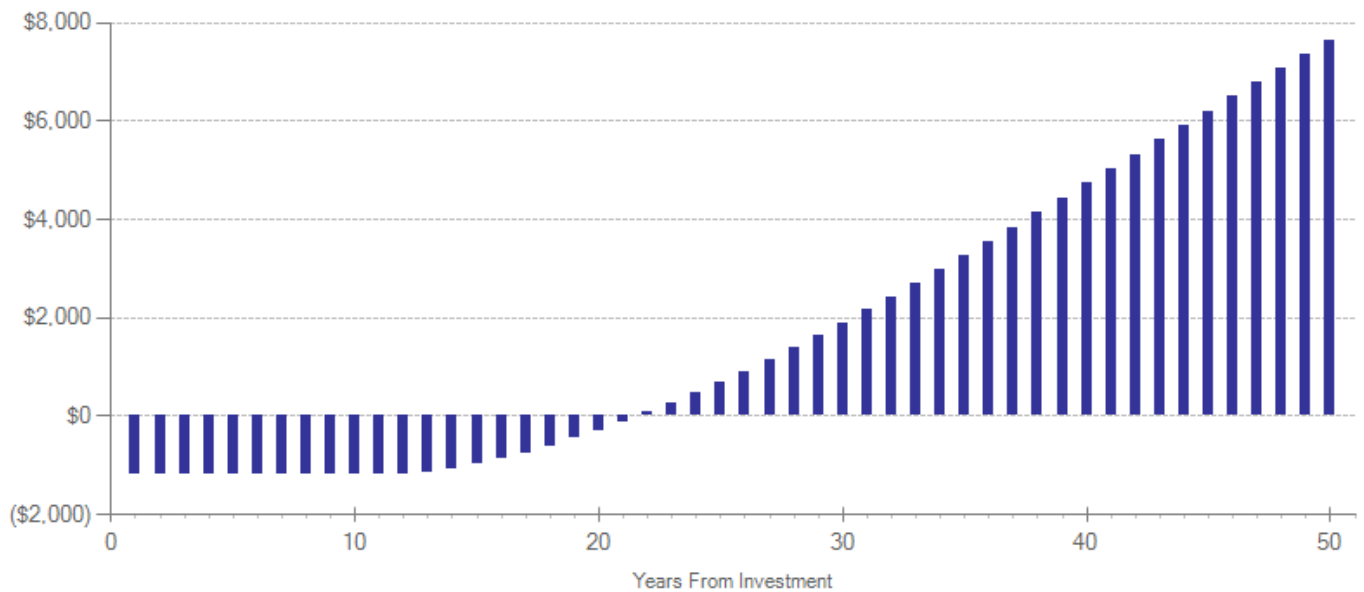| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$1,710	$729	$853	$0	$3,292
Health care (educational attainment)	($8)	$59	($44)	$31	$38
Adjustment for deadweight cost of program	$0	$0	$0	($398)	($398)
Totals	$1,702	$789	$809	($367)	$2,933

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$794	1	2013	Present value of net program costs (in 2013 dollars)	($794)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

To estimate costs, we assume that teachers spend an average of one-quarter hour per week to maintain contact with parents during the school year, based on the evaluations included in our analysis. We calculate the value of teacher time using average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	9	0.167	0.149	0.050	0.116	9	0.027	0.128	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.007	0.034	18	0.007	0.034	18

Citations Used in the Meta-Analysis

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Parents as tutors with teacher oversight

National Board for Professional Teaching Standards (NBPTS) certification bonuses
Benefit-cost estimates updated August 2014. Literature review updated April 2012.

Program Description: National Board for Professional Teaching Standards (NBPTS) certification is an advanced teaching credential that complements (and does not replace) state certification. Teachers earn NBPTS certification upon completion of a one to three year assessment process. Washington State provides a $5,000 bonus to NBPTS-certified teachers. In the 2009-10 school year, 3,686 Washington teachers were NBPTS-certified. This analysis includes taxpayer costs only (the state-funded NBPTS bonus) and does not reflect the investments individual teachers make to attain certification.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,219	Benefit to cost ratio	$12.20
Taxpayers	$557	Benefits minus costs	$2,090
Other (1)	$579	Probability of a positive net present value	100 %
Other (2)	($76)		
Total	$2,277		
Costs	($187)		
Benefits minus cost	$2,090		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$1,223	$522	$604	$0	$2,349
Health care (educational attainment)	($4)	$35	($26)	$17	$22
Adjustment for deadweight cost of program	$0	$0	$0	($94)	($94)
Totals	$1,219	$557	$579	($76)	$2,277

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
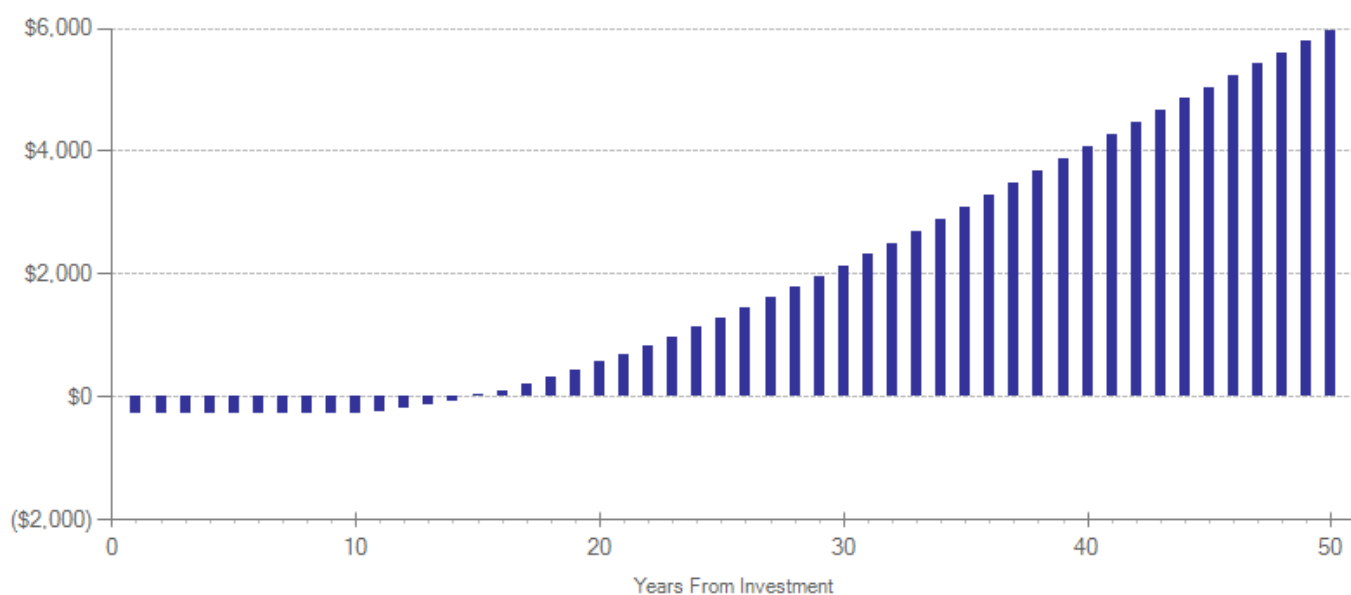
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$187	1	2013	Present value of net program costs (in 2013 dollars)	($187)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

Washington State provides NBPTS-certified teachers with a $5,000 annual bonus. To calculate a per-student annual cost, we assume that each teacher has an average of three classrooms with an average of 25 students per classroom. This cost estimate does not include the additional bonus provided to teachers who work in high-poverty schools or the private costs teachers incur when they apply for and participate in the certification process.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	5	0.026	0.001	0.026	0.004	11	0.019	0.004	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.004	0.001	17	0.004	0.001	17

Citations Used in the Meta-Analysis

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Per-pupil expenditures: 10% increase for one student cohort from kindergarten through grade 12

Benefit-cost estimates updated August 2014. Literature review updated April 2012.

Program Description: In the 2011-12 school year, Washington State school districts spent an average of $9,739 per public school student (including state, federal, local, and other sources). This analysis estimates the benefits and costs for increasing per-pupil expenditures by 10% for one cohort of students starting in kindergarten and continuing those increased expenditures for 13 years (grades K through 12).

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$6,272	Benefit to cost ratio	$1.14
Taxpayers	$3,398	Benefits minus costs	$1,604
Other (1)	$2,640	Probability of a positive net present value	53 %
Other (2)	$0		
Total	$12,309		
Costs	($10,705)		
Benefits minus cost	$1,604		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

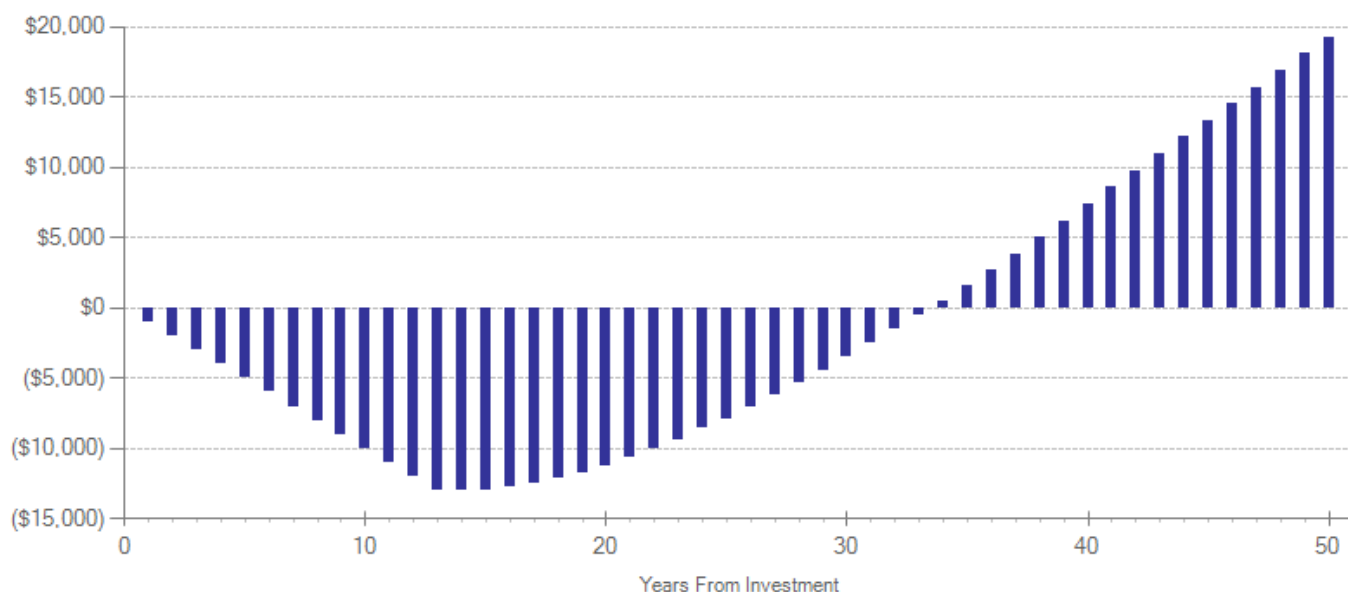| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$1	$2	$0	$2
Labor market earnings (test scores)	$6,359	$2,712	$3,143	$0	$12,214
Health care (educational attainment)	($87)	$685	($505)	$0	$93
Totals	$6,272	$3,398	$2,640	$0	$12,309

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$974	13	2011	Present value of net program costs (in 2013 dollars)	($10,705)
Comparison costs	$0	13	2011	Uncertainty (+ or - %)	0 %

Office of Superintendent of Public Instruction (2013). Financial Reporting Summary, Washington State School Districts and Educational Service Districts, Fiscal Year 9/2011-8/2012. The estimated annual cost equals 10% of the total per-pupil expenditures reported in Table 7. http://www.k12.wa.us/safs/PUB/FIN/1112/2011-12%20Financial%20Reporting%20Summary.pdf

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	40	0.101	0.050	0.101	0.042	16	0.101	0.042	20
Test scores	Primary	40	0.000	0.001	0.120	0.055	16	0.109	0.047	18

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Per-pupil expenditures: 10% increase for one student cohort from kindergarten through grade 12

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Class size: reducing average class size by one student in kindergarten

Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K through 3 (RCW 28A.150.260).   We estimate the benefits and costs of reducing kindergarten average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$855	Benefit to cost ratio	$8.02
Taxpayers	$475	Benefits minus costs	$1,430
Other (1)	$352	Probability of a positive net present value	95 %
Other (2)	($49)		
Total	$1,633		
Costs	($204)		
Benefits minus cost	$1,430		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

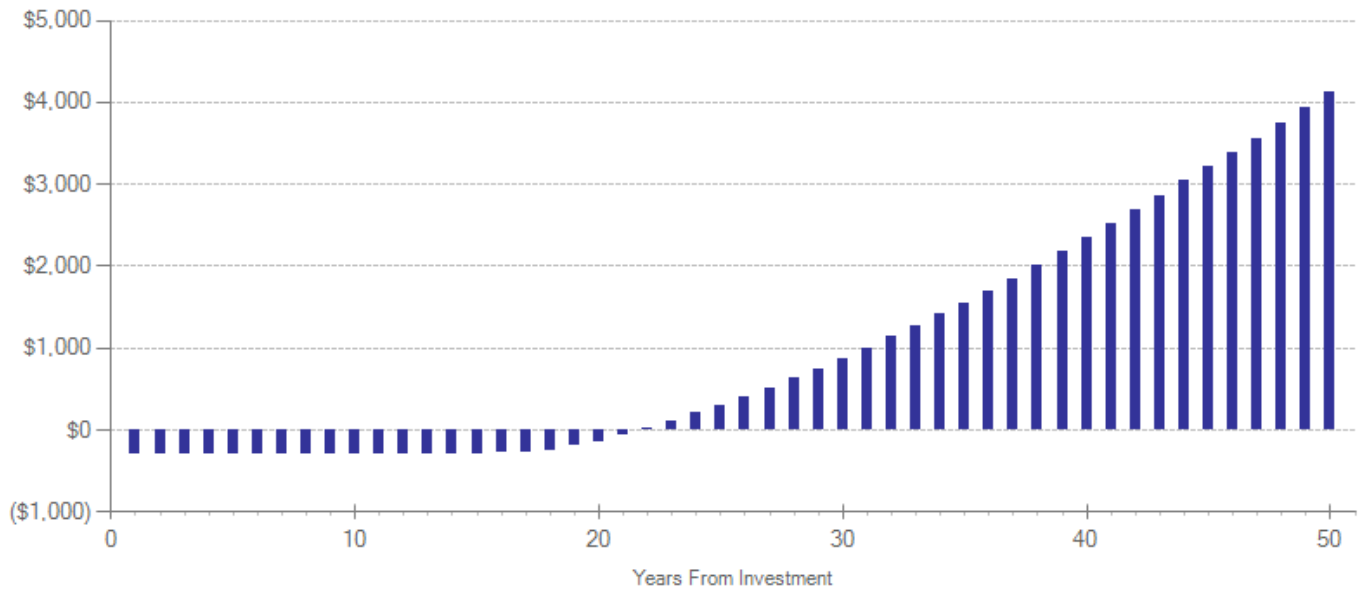| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (hs grad)	$869	$370	$429	$0	$1,668
Health care (educational attainment)	($13)	$105	($77)	$53	$67
Adjustment for deadweight cost of program	$0	$0	$0	($102)	($102)
Totals	$855	$475	$352	($49)	$1,633

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$198	1	2011	Present value of net program costs (in 2013 dollars)	($204)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects										
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.015	0.005	0.015	0.005	5	0.015	0.005	17
Test scores	Primary	77	0.036	0.005	0.036	0.013	5	0.011	0.005	17

Citations Used in the Meta-Analysis

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Class size: reducing average class size by one student in kindergarten

Summer book programs: One-year intervention
Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The summer book programs included in this analysis provide free books to elementaryschool students. Generally, the goals of summer book programs include increases in print exposure, the number of books at home, and voluntary reading time. Books are matched to each student's reading level and area of interest and are mailed to students weekly over the summer break. The mailing includes a form for the student to complete after finishing the book. This analysis includes school-based programs only and does not include bookmobiles or public library programs. The studies included in this analysis measure the program's impact after one summer.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$780	Benefit to cost ratio	$19.36
Taxpayers	$366	Benefits minus costs	$1,411
Other (1)	$365	Probability of a positive net present value	57 %
Other (2)	($23)		
Total	$1,488		
Costs	($77)		
Benefits minus cost	$1,411		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

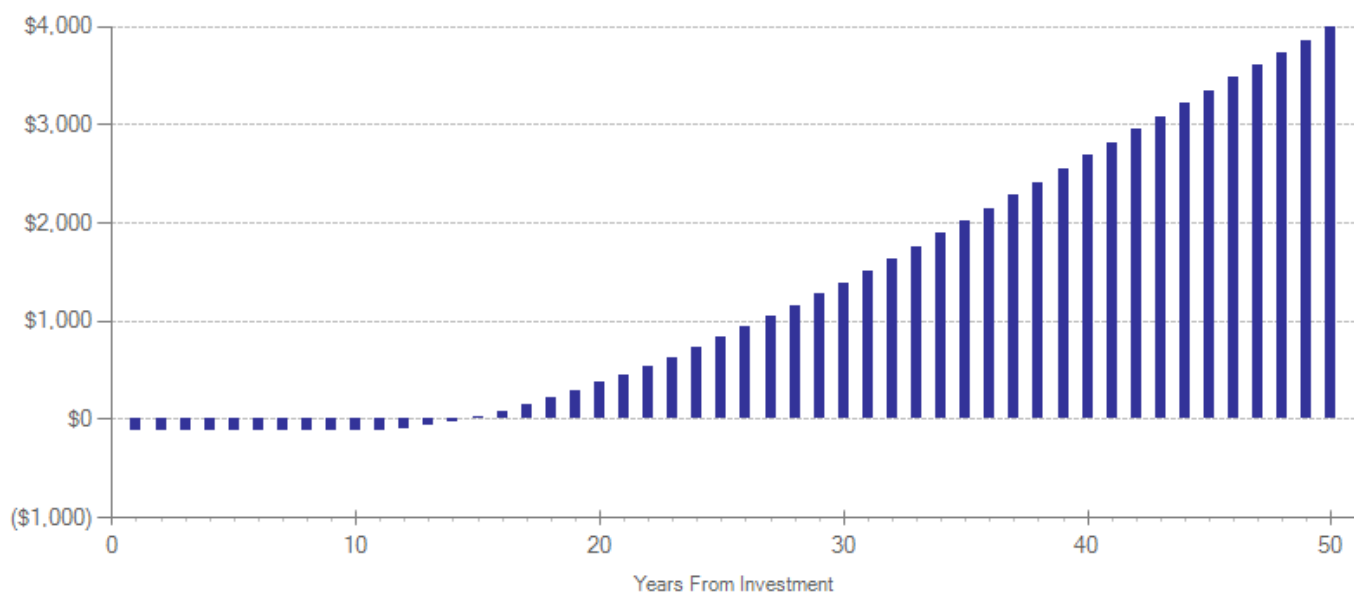| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$784	$334	$388	$0	$1,507
Health care (educational attainment)	($4)	$31	($23)	$16	$20
Adjustment for deadweight cost of program	$0	$0	$0	($39)	($39)
Totals	$780	$366	$365	($23)	$1,488

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$77	1	2013	Present value of net program costs (in 2013 dollars)	($77)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for the time it takes teachers to administer the program. In addition to compensation, the estimate accounts for the cost of purchasing and shipping ten books to each student's home.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	3	0.019	0.752	0.019	0.061	9	0.013	0.067	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.004	0.018	18	0.004	0.018	18

Citations Used in the Meta-Analysis

Kim, J.S. (2007). The effects of a voluntary summer reading intervention on reading activities and reading achievement. *Journal of Educational Psychology, 99*(3), 505-515.

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Teacher professional development: Online, targeted

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. Online, targeted PD provides online training and collaboration with a focus on improving teaching in a particular content areas (such as reading, math, and science) and/or a particular grade level.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$900	Benefit to cost ratio	$5.54
Taxpayers	$417	Benefits minus costs	$1,319
Other (1)	$423	Probability of a positive net present value	57 %
Other (2)	($130)		
Total	$1,610		
Costs	($291)		
Benefits minus cost	$1,319		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

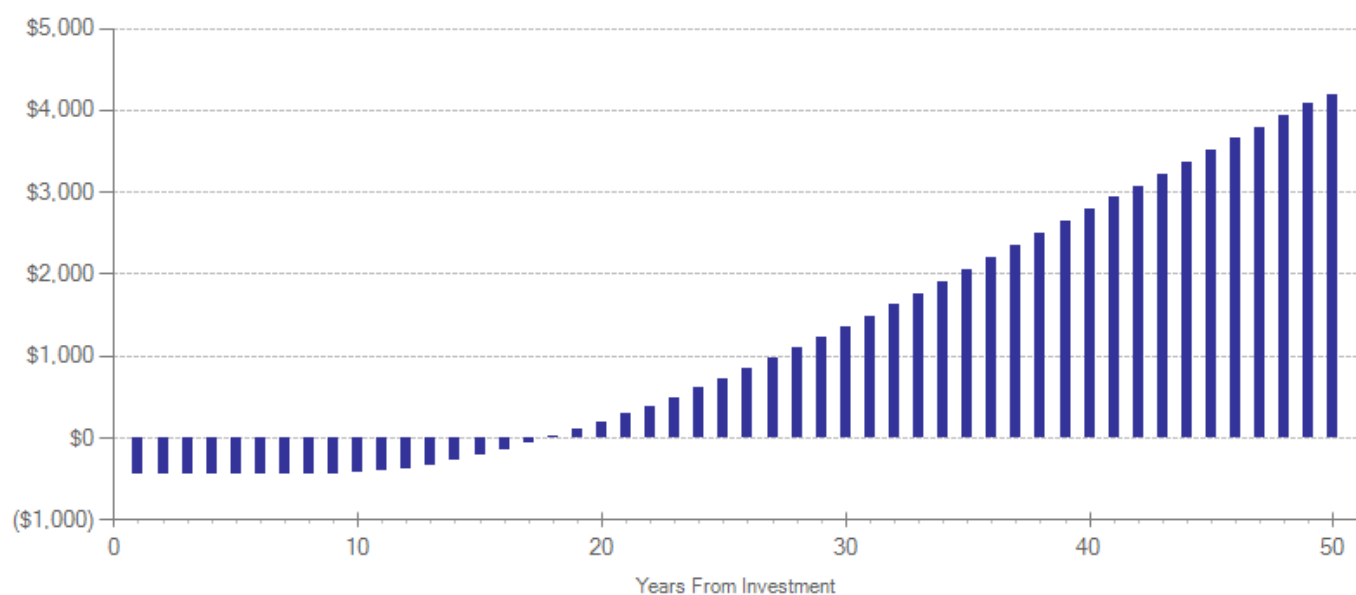| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$904	$386	$446	$0	$1,736
Health care (educational attainment)	($4)	$31	($23)	$15	$20
Adjustment for deadweight cost of program	$0	$0	$0	($146)	($146)
Totals	$900	$417	$423	($130)	$1,610

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$291	1	2013	Present value of net program costs (in 2013 dollars)	($291)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 70 additional hours of targeted online professional development (PD) in comparison with the usual amount of PD time. We calculate the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divide compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	3	0.164	0.002	0.021	0.049	10	0.014	0.054	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.004	0.014	18	0.004	0.014	18

Citations Used in the Meta-Analysis

Dash, S., de, Kramer, R.M., O'Dwyer, L.M., Masters, J., & Russell, M. (2012). Impact of online professional development on teacher quality and student achievement in fifth grade mathematics. *Journal of Research on Technology in Education, 45*(1), 1-26.

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Tutoring: By adults, one-on-one, non-structured

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: The tutoring programs included in this analysis provide one-on-one assistance to struggling students in English language arts and/or mathematics. The evaluated programs typically allow tutors to exercise their own discretion when selecting and implementing tutoring strategies. The programs provide, on average, about 30 hours of tutoring time to an individual student each year. The tutors are non-certificated adults (e.g. instructional aides and community volunteers) who receive approximately two hours of training per year.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$1,406	Benefit to cost ratio	$1.43
Taxpayers	$653	Benefits minus costs	$608
Other (1)	$661	Probability of a positive net present value	51 %
Other (2)	($687)		
Total	$2,032		
Costs	($1,425)		
Benefits minus cost	$608		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

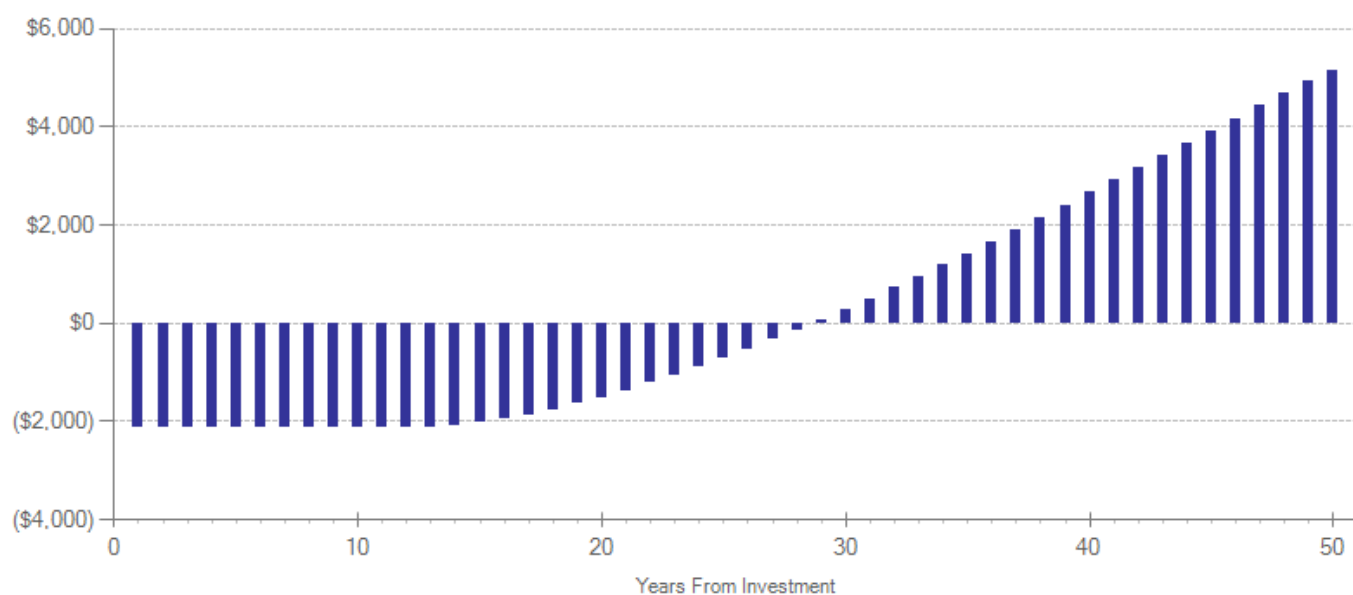| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$1,412	$602	$698	$0	$2,713
Health care (educational attainment)	($6)	$50	($37)	$25	$32
Adjustment for deadweight cost of program	$0	$0	$0	($713)	($713)
Totals	$1,406	$653	$661	($687)	$2,032

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$1,425	1	2013	Present value of net program costs (in 2013 dollars)	($1,425)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, the average non-structured one-on-one tutoring program provides 30 hours of intervention per student and two hours of training time per tutor. The estimate assumes that certificated teachers provide approximately four hours of planning support and oversight. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher and instructional aides as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	15	0.052	0.214	0.050	0.042	7	0.024	0.046	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.006	0.012	18	0.006	0.012	18

Citations Used in the Meta-Analysis

Baker, S., Gersten, R., & Keating, T. (2000). When less may be more: A 2-year longitudinal evaluation of a volunteer tutoring program requiring minimal training. *Reading Research Quarterly, 35*(4), 494-519.

Cobb, J.B. (2000). The effects of an early intervention program with preservice teachers as tutors on the reading achievement of primary grade at risk children. *Reading Horizons, 41*(3), 155-173.

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McKinney, A.D. (1995). The effects of an after-school tutorial and enrichment program on the academic achievement and self-concept of below grade level first and second grade students. *Dissertation Abstracts International, 56*(06), 2176A.

Rimm-Kaufman, S.E., Kagan, J., & Byers, H. (1999). The effectiveness of adult volunteer tutoring on reading among 'at risk' first grade children. *Reading Research and Instruction, 38*(2), 143-152.

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Tutoring: By adults, one-on-one, non-structured

Teacher performance pay programs

Benefit-cost estimates updated August 2014. Literature review updated April 2012.

Program Description: Teacher performance pay programs distribute bonuses to individual teachers and sometimes to school wide staff. Performance is usually measured as value-added student test scores alone or in combination with some other assessment (such as principal evaluations). These evaluations examine the impact on student test scores from short-term, pilot performance pay programs.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$333	Benefit to cost ratio	$18.14
Taxpayers	$154	Benefits minus costs	$597
Other (1)	$157	Probability of a positive net present value	63 %
Other (2)	($12)		
Total	$632		
Costs	($35)		
Benefits minus cost	$597		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

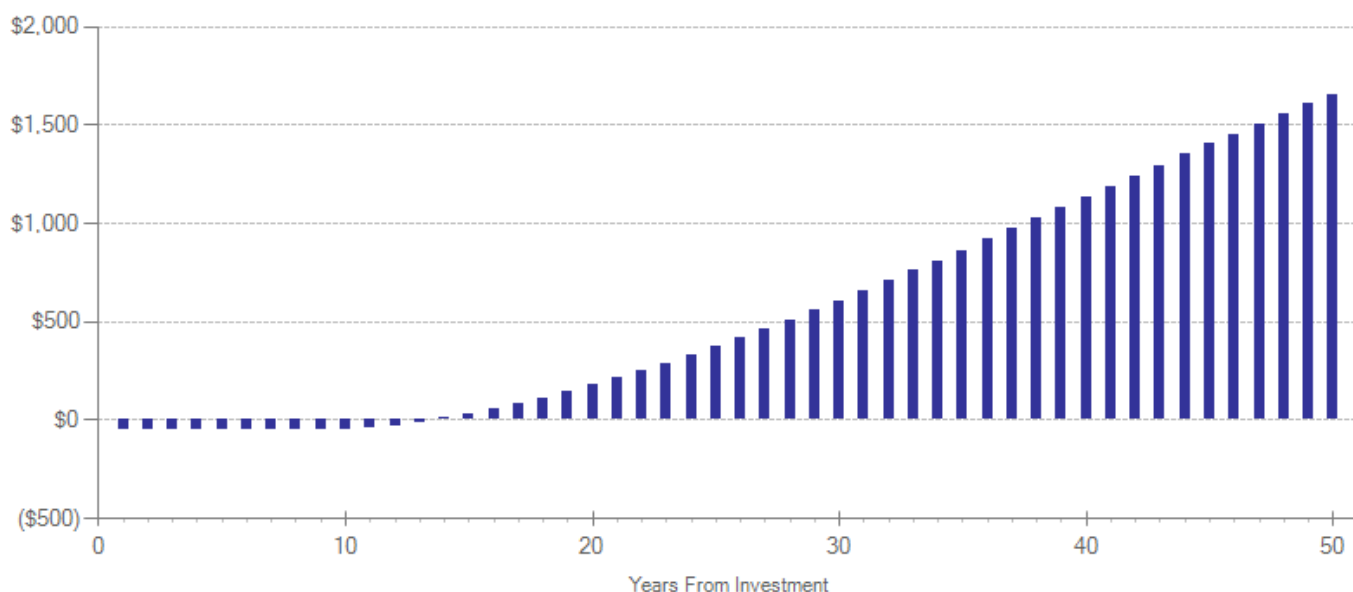| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$334	$143	$166	$0	$642
Health care (educational attainment)	($1)	$11	($8)	$6	$7
Adjustment for deadweight cost of program	$0	$0	$0	($18)	($18)
Totals	$333	$154	$157	($12)	$632

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$33	1	2010	Present value of net program costs (in 2013 dollars)	($35)
Comparison costs	$0	0	2010	Uncertainty (+ or - %)	20 %

The performance bonuses in the evaluated programs ranged from a maximum of $1,500 to a maximum of $15,000; in over half of the programs, the maximum award was $3,000. For this estimate, we assume an average bonus of approximately $2,500 per teacher (including administrative costs), spread across 25 students.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	21	0.007	0.598	0.007	0.013	11	0.005	0.014	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.001	0.004	18	0.001	0.004	18

Citations Used in the Meta-Analysis

Dee, T.S., & Keys, B.J. (2004). Does merit pay reward good teachers? Evidence from a randomized experiment. *Journal of Policy Analysis and Management, 23*(3), 471-488.

Figlio, D.N., & Kenny, L.W. (2007). Individual teacher incentives and student performance. *Journal of Public Economics, 91*(5-6), 901-914.

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Glazerman, S., Seifullah, A. (2010). *An evaluation of the Teacher Advancement Program (TAP) in Chicago: Year two impact report.* Washington, DC: Mathematica Policy Research.

Goodman, S., & Turner, L. (2010). *Teacher incentive pay and educational outcomes: Evidence from the NYC Bonus Program.* Unpublished manuscript, Columbia University, New York.

Hudson, S. (2010). *The effects of performance-based teacher pay on student achievement.* Discussion Paper for the Stanford Institute for Economic Policy Research, Stanford University. Retrieved from: http://www.stanford.edu/group/siepr/cgi- bin/siepr/?q=system/files/shared/pubs/papers/09-023_Paper_Hudson.pdf

Marsh, J.A., Springer, M.G., & McCaffrey, D F. (2011). *A Big Apple for Educators: Final Evaluation Report.* Santa Monica: RAND Corp.

Educator professional development: Use of data to guide instruction

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: One form of professional development (PD) involves training educators how to use student academic assessment data to modify and improve instruction. In this "train the trainers" approach, administrators and teacher-leaders directly receive the training and then share what they have learned with classroom teachers. This type of PD is usually paired with computer software that tracks and reports student assessment data to teachers. The specific types of assessments and software evaluated and included in this meta-analysis are (in no particular order) Individualized Student Instruction (ISI) using A2i software and Ohio's Personalized Assessment Reporting System (PARS).

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$297	Benefit to cost ratio	$31.80
Taxpayers	$136	Benefits minus costs	$548
Other (1)	$138	Probability of a positive net present value	53 %
Other (2)	($5)		
Total	$566		
Costs	($18)		
Benefits minus cost	$548		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$298	$127	$144	$0	$569
Health care (educational attainment)	($1)	$8	($6)	$4	$5
Adjustment for deadweight cost of program	$0	$0	$0	($9)	($9)
Totals	$297	$136	$138	($5)	$566

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
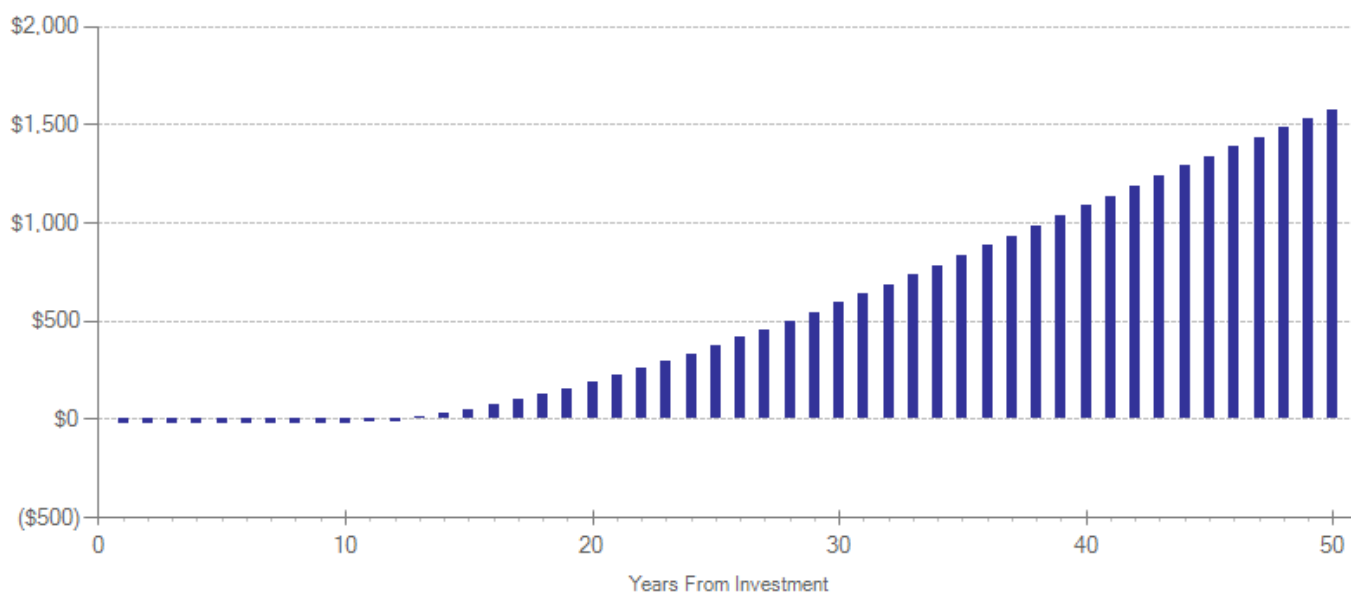
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$18	1	2013	Present value of net program costs (in 2013 dollars)	($18)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in this meta-analysis, educators received an average of three hours of training in how to use student assessment data to guide instruction. We calculate the value of PD time using average teacher salaries (including benefits) as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divide compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	2	0.007	0.894	0.007	0.052	10	0.004	0.057	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.001	0.013	18	0.001	0.013	18

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Class size: reducing average class size by one student in grade 1
Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K through 3 (RCW 28A.150.260). We estimate the benefits and costs of reducing grade 1 average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$419	Benefit to cost ratio	$3.62
Taxpayers	$219	Benefits minus costs	$534
Other (1)	$182	Probability of a positive net present value	80 %
Other (2)	($83)		
Total	$737		
Costs	($204)		
Benefits minus cost	$534		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$424	$181	$210	$0	$815
Health care (educational attainment)	($5)	$38	($28)	$19	$24
Adjustment for deadweight cost of program	$0	$0	$0	($102)	($102)
Totals	$419	$219	$182	($83)	$737

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$198	1	2011	Present value of net program costs (in 2013 dollars)	($204)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis				
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.005	0.163	0.005	0.004	6	0.005	0.004	17
Test scores	Primary	77	0.018	0.059	0.018	0.010	6	0.007	0.005	17

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Class size: reducing average class size by one student in grade 2
Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K through 3 (RCW 28A.150.260).   We estimate the benefits and costs of reducing grade 2 average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$284	Benefit to cost ratio	$2.34
Taxpayers	$159	Benefits minus costs	$272
Other (1)	$117	Probability of a positive net present value	65 %
Other (2)	($84)		
Total	$476		
Costs	($204)		
Benefits minus cost	$272		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

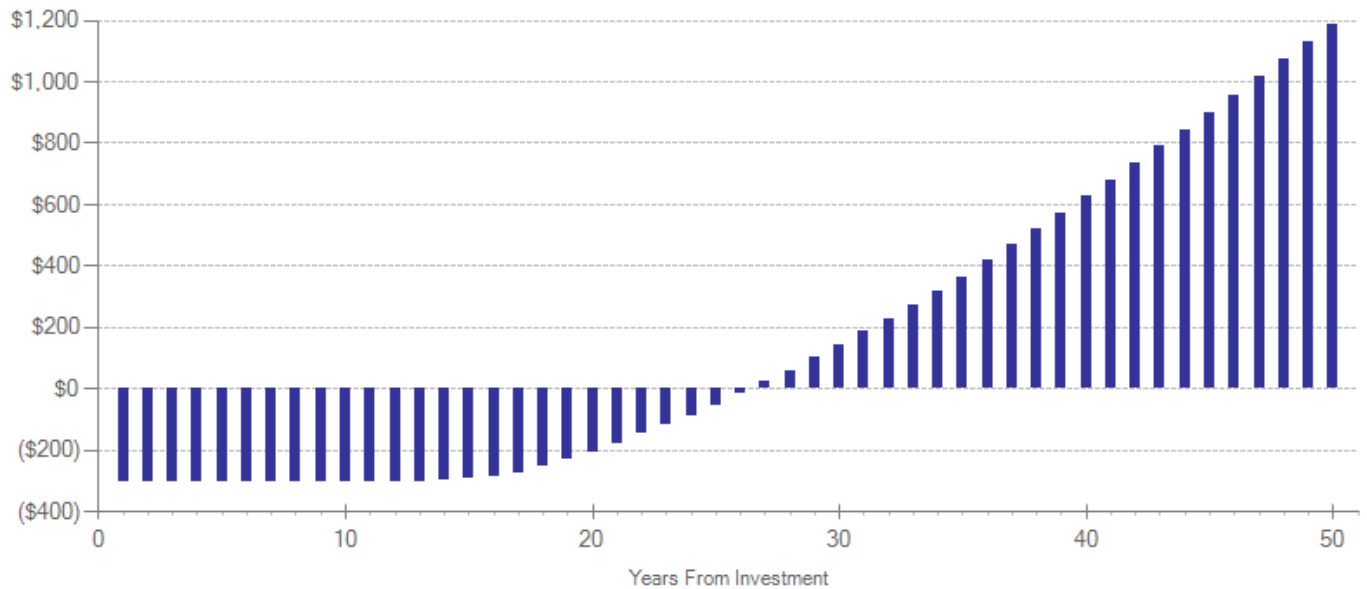| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (hs grad)	$289	$123	$143	$0	$555
Health care (educational attainment)	($5)	$35	($26)	$17	$22
Adjustment for deadweight cost of program	$0	$0	$0	($102)	($102)
Totals	$284	$159	$117	($84)	$476

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$198	1	2011	Present value of net program costs (in 2013 dollars)	($204)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.005	0.204	0.005	0.004	7	0.005	0.004	17
Test scores	Primary	77	0.010	0.286	0.009	0.009	7	0.005	0.005	17

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Class size: reducing average class size by one student in grade 3
Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K through 3 (RCW 28A.150.260). We estimate the benefits and costs of reducing grade 3 average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$219	Benefit to cost ratio	$1.69
Taxpayers	$123	Benefits minus costs	$141
Other (1)	$90	Probability of a positive net present value	55 %
Other (2)	($88)		
Total	$344		
Costs	($204)		
Benefits minus cost	$141		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

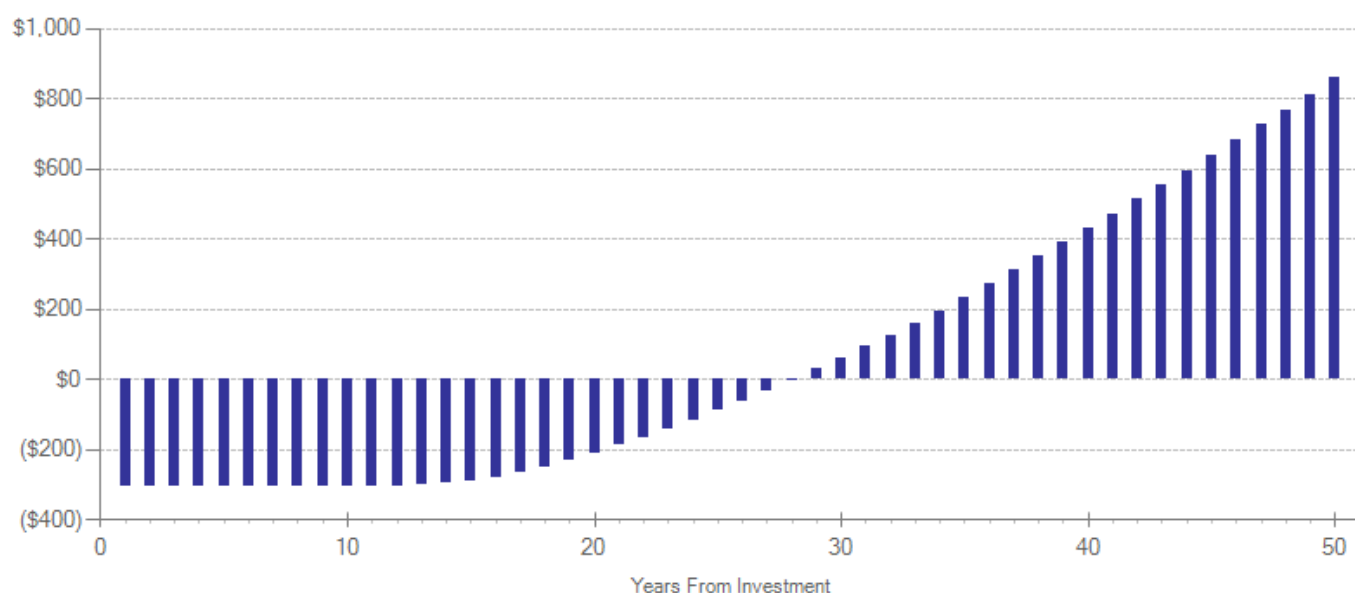| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (hs grad)	$223	$95	$111	$0	$429
Health care (educational attainment)	($4)	$28	($21)	$14	$18
Adjustment for deadweight cost of program	$0	$0	$0	($102)	($102)
Totals	$219	$123	$90	($88)	$344

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$198	1	2011	Present value of net program costs (in 2013 dollars)	($204)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.004	0.317	0.004	0.004	8	0.004	0.004	17
Test scores	Primary	77	0.007	0.452	0.007	0.009	8	0.004	0.005	17

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Class size: reducing average class size by one student in one grade, 9-12

Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 28.74 students in grades 9 through 12 (RCW 28A.150.260). We estimate the benefits and costs of reducing high school average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$169	Benefit to cost ratio	$1.57
Taxpayers	$90	Benefits minus costs	$93
Other (1)	$72	Probability of a positive net present value	51 %
Other (2)	($73)		
Total	$257		
Costs	($164)		
Benefits minus cost	$93		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$171	$73	$85	$0	$328
Health care (educational attainment)	($2)	$17	($12)	$8	$11
Adjustment for deadweight cost of program	$0	$0	$0	($82)	($82)
Totals	$169	$90	$72	($73)	$257

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
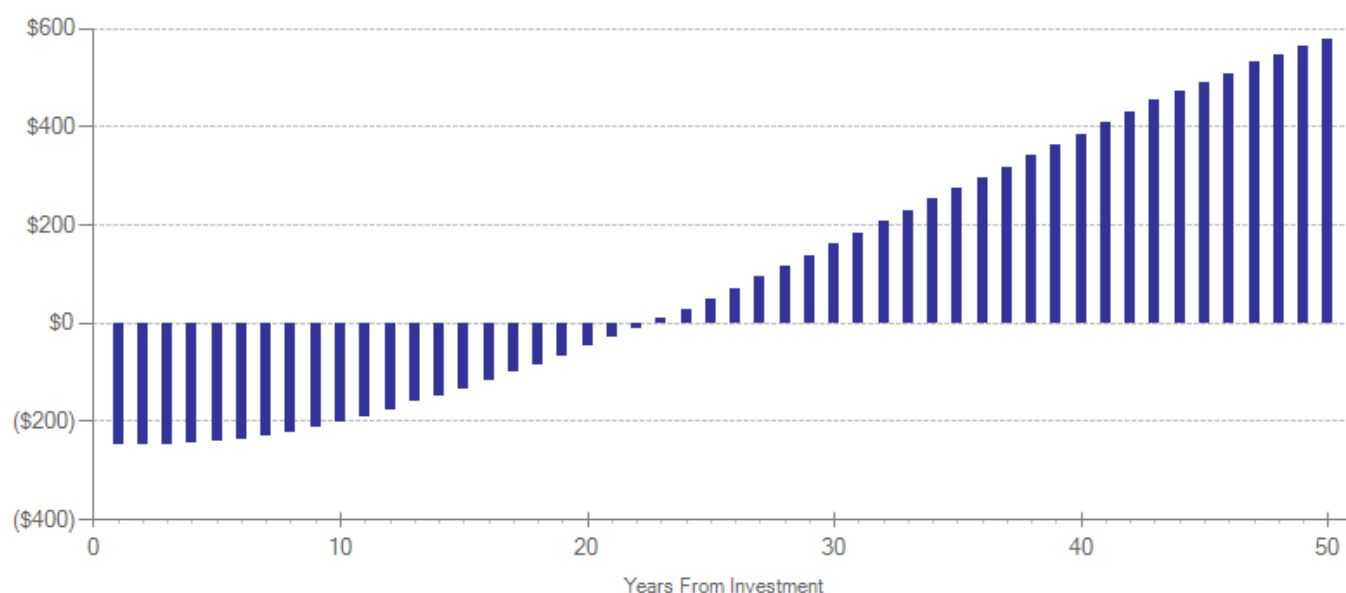
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$160	1	2011	Present value of net program costs (in 2013 dollars)	($164)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis				
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.002	0.583	0.002	0.003	16	0.002	0.003	17
Test scores	Primary	77	0.002	0.781	0.002	0.008	16	0.002	0.007	17

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Class size: reducing average class size by one student in one grade, 4-6

Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 27 students in grades 4 through 6 (RCW 28A.150.260). We estimate the benefits and costs of reducing grades 4-6 average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$172	Benefit to cost ratio	$1.40
Taxpayers	$96	Benefits minus costs	$74
Other (1)	$70	Probability of a positive net present value	52 %
Other (2)	($81)		
Total	$258		
Costs	($184)		
Benefits minus cost	$74		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$175	$75	$86	$0	$336
Health care (educational attainment)	($3)	$22	($16)	$11	$14
Adjustment for deadweight cost of program	$0	$0	$0	($92)	($92)
Totals	$172	$96	$70	($81)	$258

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
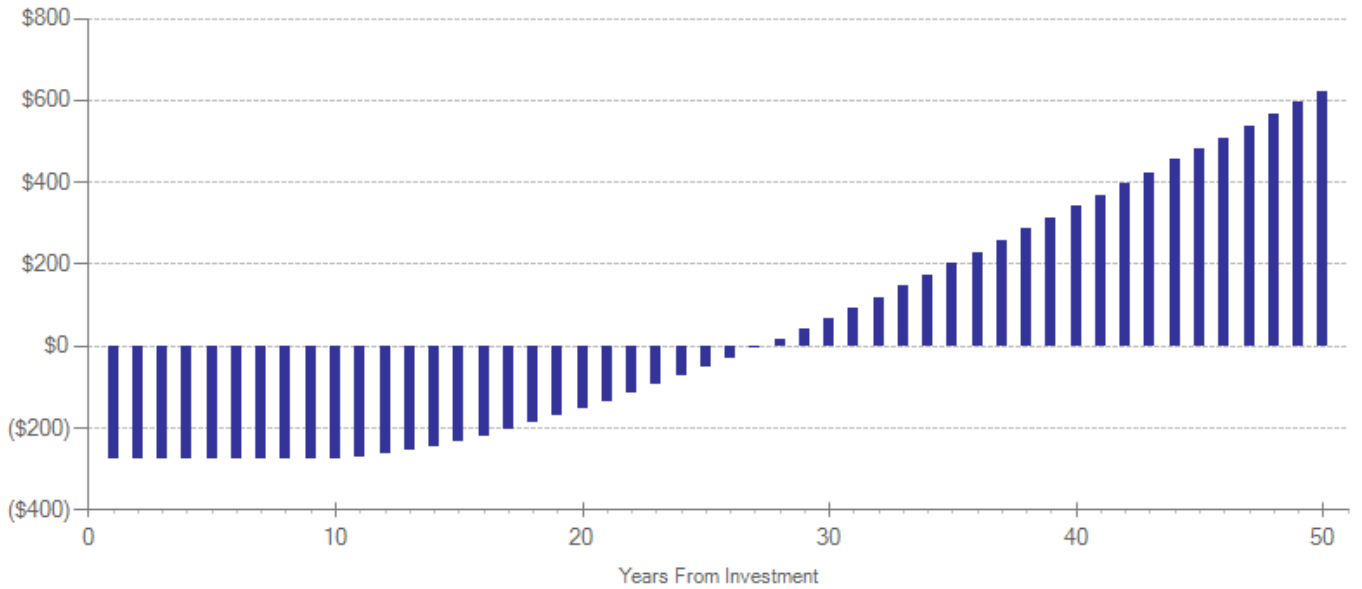
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$179	1	2011	Present value of net program costs (in 2013 dollars)	($184)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.003	0.431	0.003	0.003	10	0.003	0.003	17
Test scores	Primary	77	0.004	0.621	0.004	0.008	10	0.003	0.006	17

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Class size: reducing average class size by one student in one grade, 7-8

Benefit-cost estimates updated August 2014. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 28.53 students in grades 7 and 8 (RCW 28A.150.260). We estimate the benefits and costs of reducing grades 7-8 average class sizes by one student.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$158	Benefit to cost ratio	$1.42
Taxpayers	$87	Benefits minus costs	$70
Other (1)	$66	Probability of a positive net present value	51 %
Other (2)	($74)		
Total	$237		
Costs	($167)		
Benefits minus cost	$70		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$161	$69	$79	$0	$309
Health care (educational attainment)	($2)	$18	($13)	$9	$11
Adjustment for deadweight cost of program	$0	$0	$0	($84)	($84)
Totals	$158	$87	$66	($74)	$237

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.
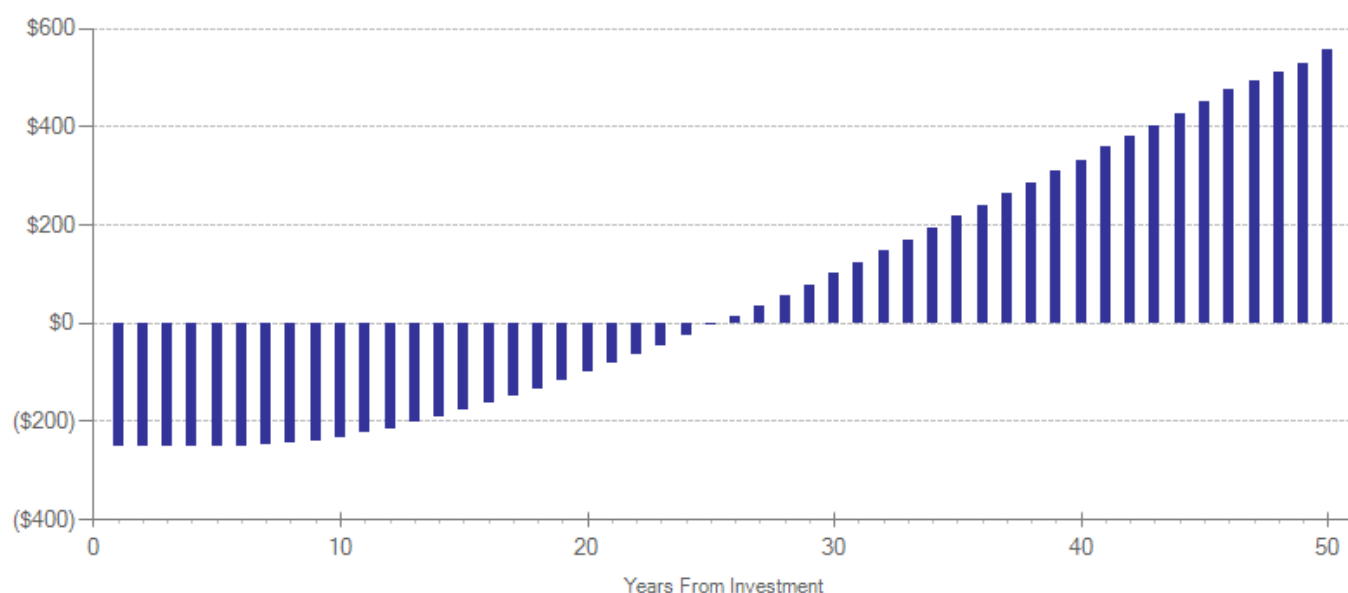
Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$162	1	2011	Present value of net program costs (in 2013 dollars)	($167)
Comparison costs	$0	1	2011	Uncertainty (+ or - %)	0 %

These costs account for state and school district teacher salary and benefits expenses, along with some other marginal operating costs. We also include increased capital cost amortization in this estimate. Aos, S. & Pennucci, A. (2013). K–12 Class Size Reductions and Student Outcomes: A Review of the Evidence and Benefit-Cost Analysis (Document No. 13-01-2201). Olympia: Washington State Institute for Public Policy

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
High school graduation	Primary	77	0.002	0.532	0.002	0.003	13	0.002	0.003	17
Test scores	Primary	77	0.003	0.723	0.003	0.008	13	0.002	0.006	17

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Teacher professional development: Not targeted

Benefit-cost estimates updated August 2014. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. The evaluations included in this analysis examine impacts on student outcomes from providing more time and funding for teacher PD without directing how those resources are used.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$8	Benefit to cost ratio	($0.31)
Taxpayers	$5	Benefits minus costs	($113)
Other (1)	$3	Probability of a positive net present value	24 %
Other (2)	($43)		
Total	($27)		
Costs	($86)		
Benefits minus cost	($113)		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

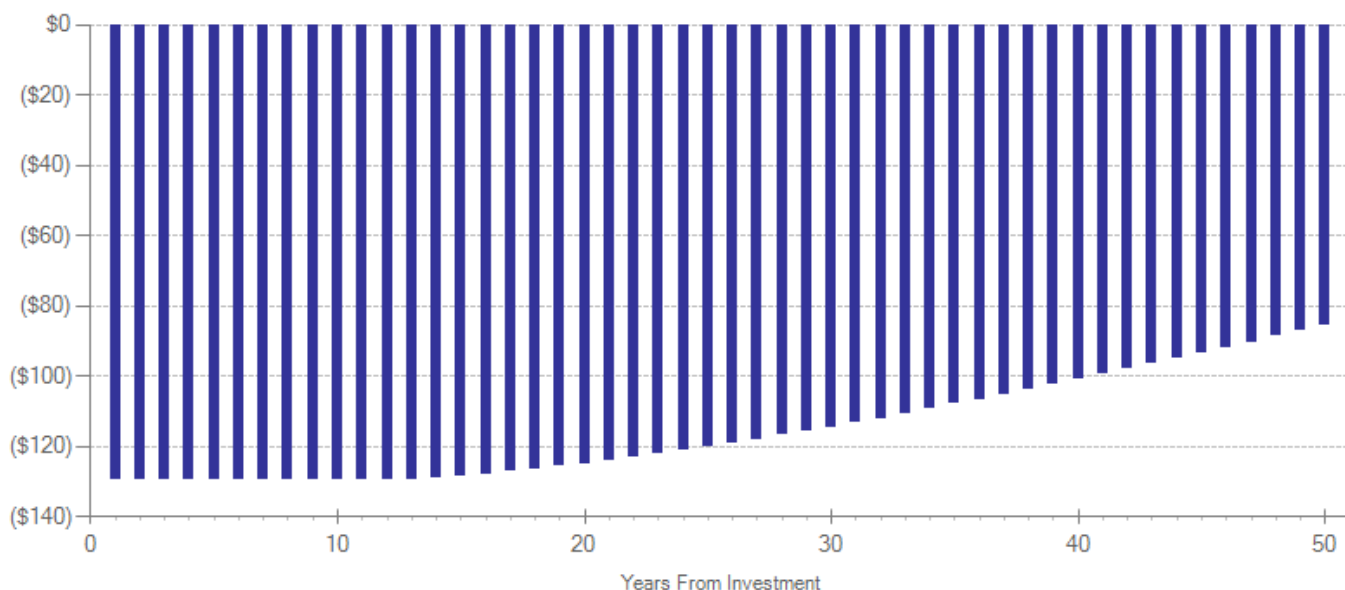| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (hs grad)	$8	$4	$4	$0	$16
Health care (educational attainment)	$0	$1	($1)	$0	$1
Adjustment for deadweight cost of program	$0	$0	$0	($43)	($43)
Totals	$8	$5	$3	($43)	($27)

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$86	1	2013	Present value of net program costs (in 2013 dollars)	($86)
Comparison costs	$0	1	2013	Uncertainty (+ or - %)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 20 additional hours of non-targeted professional development (PD) in comparison with the usual amount of PD time. We calculate the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divide compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	12	0.000	0.934	0.000	0.005	10	0.000	0.006	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.000	0.002	18	0.000	0.002	18

Citations Used in the Meta-Analysis

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Full-day kindergarten

Benefit-cost estimates updated August 2014. Literature review updated December 2013.

Program Description: Full day kindergarten compared to half day kindergarten.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$417	Benefit to cost ratio	($0.19)
Taxpayers	$192	Benefits minus costs	($3,195)
Other (1)	$197	Probability of a positive net present value	14 %
Other (2)	($1,325)		
Total	($519)		
Costs	($2,677)		
Benefits minus cost	($3,195)		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

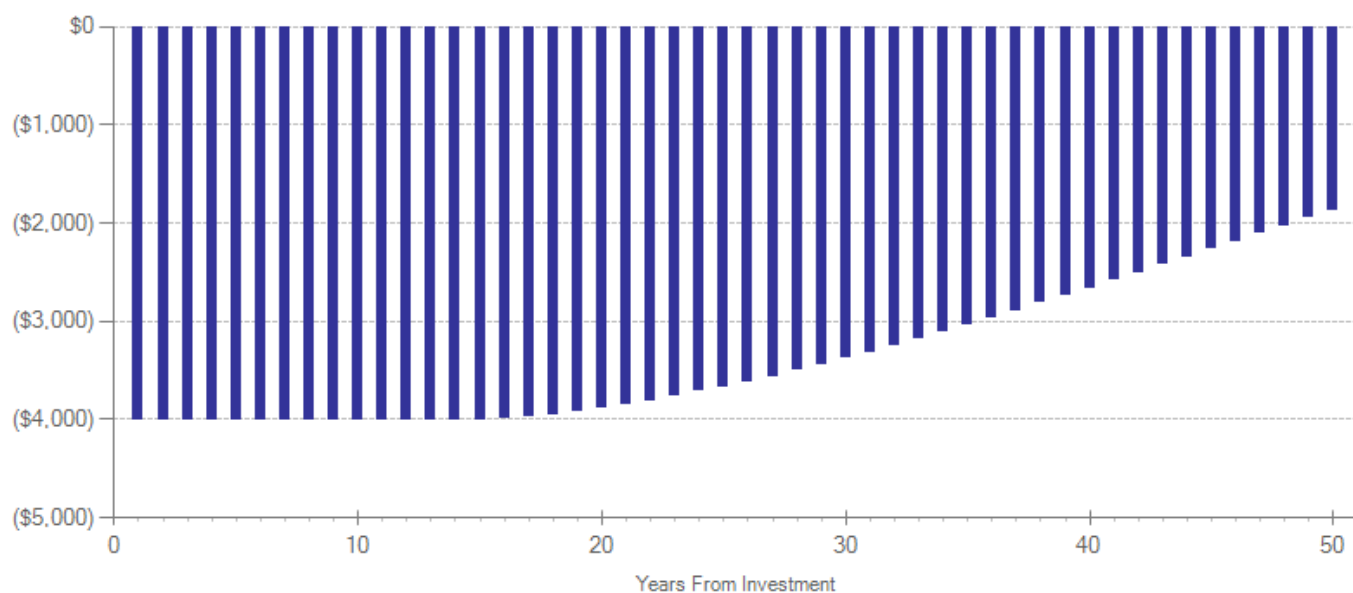| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	$419	$179	$207	$0	$804
Health care (educational attainment)	($2)	$13	($10)	$6	$8
Adjustment for deadweight cost of program	$0	$0	$0	($1,331)	($1,331)
Totals	$417	$192	$197	($1,325)	($519)

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$3,151	1	2012	Present value of net program costs (in 2013 dollars)	($2,677)
Comparison costs	$505	1	2012	Uncertainty (+ or - %)	10 %

Treatment costs are the increased cost to provide full-day kindergarten rather than half-day kindergarten; Comparison costs are cost of half-day subsidized child care for 50% of the 48.1% of students receive free or reduced price lunch.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	5	0.014	0.789	0.014	0.052	8	0.008	0.028	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.002	0.007	18	0.002	0.007	18

Citations Used in the Meta-Analysis

Cannon, S. J., Jacknowitz, A., & Painter, G., (2006). Is full better than half? Examining the longitudinal effects of full-day kindergarten attendance. *Journal of Policy Analysis and Management, 25*(2), 299-321.

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Even Start

Benefit-cost estimates updated August 2014. Literature review updated April 2012.

Program Description: Even Start is a federally funded program that provides adult education, parenting education, and parent-child literacy activities to low-income families.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	($972)	Benefit to cost ratio	($0.95)
Taxpayers	($447)	Benefits minus costs	($8,169)
Other (1)	($454)	Probability of a positive net present value	26 %
Other (2)	($2,109)		
Total	($3,982)		
Costs	($4,187)		
Benefits minus cost	($8,169)		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.
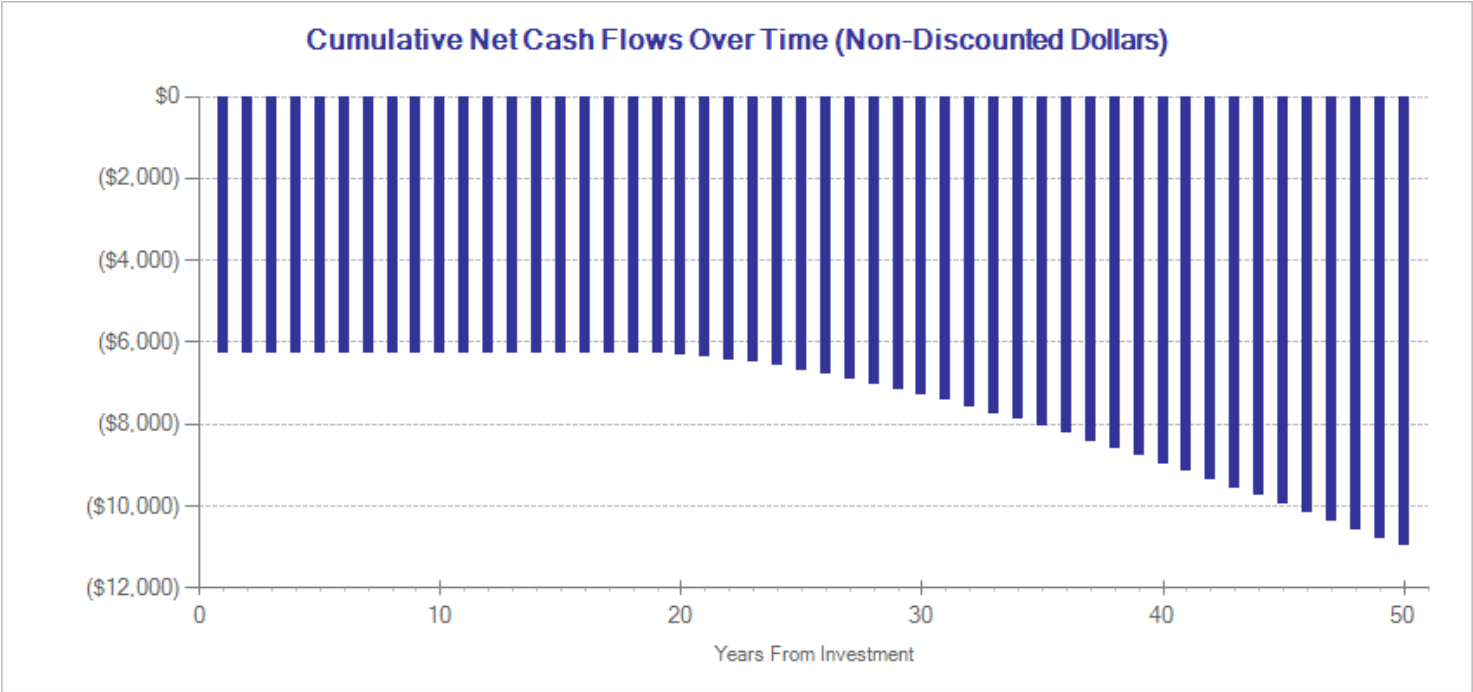
Detailed Monetary Benefit Estimates

Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	$0	$0	$0	$0
Labor market earnings (test scores)	($976)	($416)	($477)	$0	($1,868)
Health care (educational attainment)	$4	($31)	$23	($15)	($20)
Adjustment for deadweight cost of program	$0	$0	$0	($2,093)	($2,093)
Totals	($972)	($447)	($454)	($2,109)	($3,982)

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$4,708	1	2001	Present value of net program costs (in 2013 dollars)	($4,187)
Comparison costs	$1,679	1	2010	Uncertainty (+ or - %)	10 %

St. Pierre, R.G., A. Ricciuti, F. Tao, C. Creps, J. Swartz, W. Lee, A. Parsad, and T. Rimdzius. (2003) "Third National Even Start Evaluation: Program Impacts and Implications for Improvement." Cambridge, MA. Abt Associates, Inc.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Cumulative Net Cash Flows Over Time (Non-Discounted Dollars)

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	2	-0.051	0.718	-0.051	0.142	6	-0.020	0.156	17
GED attainment	Secondary	2	0.074	0.753	0.074	0.234	31	0.074	0.234	41
Adult literacy	Secondary	2	0.006	0.961	0.006	0.124	31	0.006	0.124	41
Employment	Secondary	2	0.004	0.984	0.004	0.216	31	0.004	0.216	41
High school grad via test scores	Primary	n/a	n/a	n/a	-0.004	0.018	17	-0.004	0.018	17

Citations Used in the Meta-Analysis

St. Pierre, R., Ricciuti, A., Tao, F., Creps, C., Swartz, J., Lee, W., . . . Rimdzius, T. (2003). *Third national Even Start evaluation: Program impacts and implications for improvement.* Cambridge: Abt Associates.

St. Pierre, R., Swartz, J., Gamse, B., Murray, S., Deck, D., & Nickel, P. (1995). *National evaluation of the Even Start Family Literacy Program.* Cambridge: Abt Associates.

Early Head Start

Benefit-cost estimates updated August 2014. Literature review updated April 2012.

Program Description: Early Head Start is a federally funded program for low-income pregnant women and families with infants or toddlers that aims to enhance children's development and health and strengthen families. Families can receive services until the children are three years old. Early Head Start accounts for 10 percent of the Head Start budget; program providers determine the specific services offered following Head Start guidelines.

Benefit-Cost Summary

Program benefits		Summary statistics	
Participants	$126	Benefit to cost ratio	($0.16)
Taxpayers	$3,103	Benefits minus costs	($12,492)
Other (1)	$277	Probability of a positive net present value	16 %
Other (2)	($5,231)		
Total	($1,725)		
Costs	($10,767)		
Benefits minus cost	($12,492)		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2013). The economic discount rates and other relevant parameters are described in our technical documentation.

Detailed Monetary Benefit Estimates

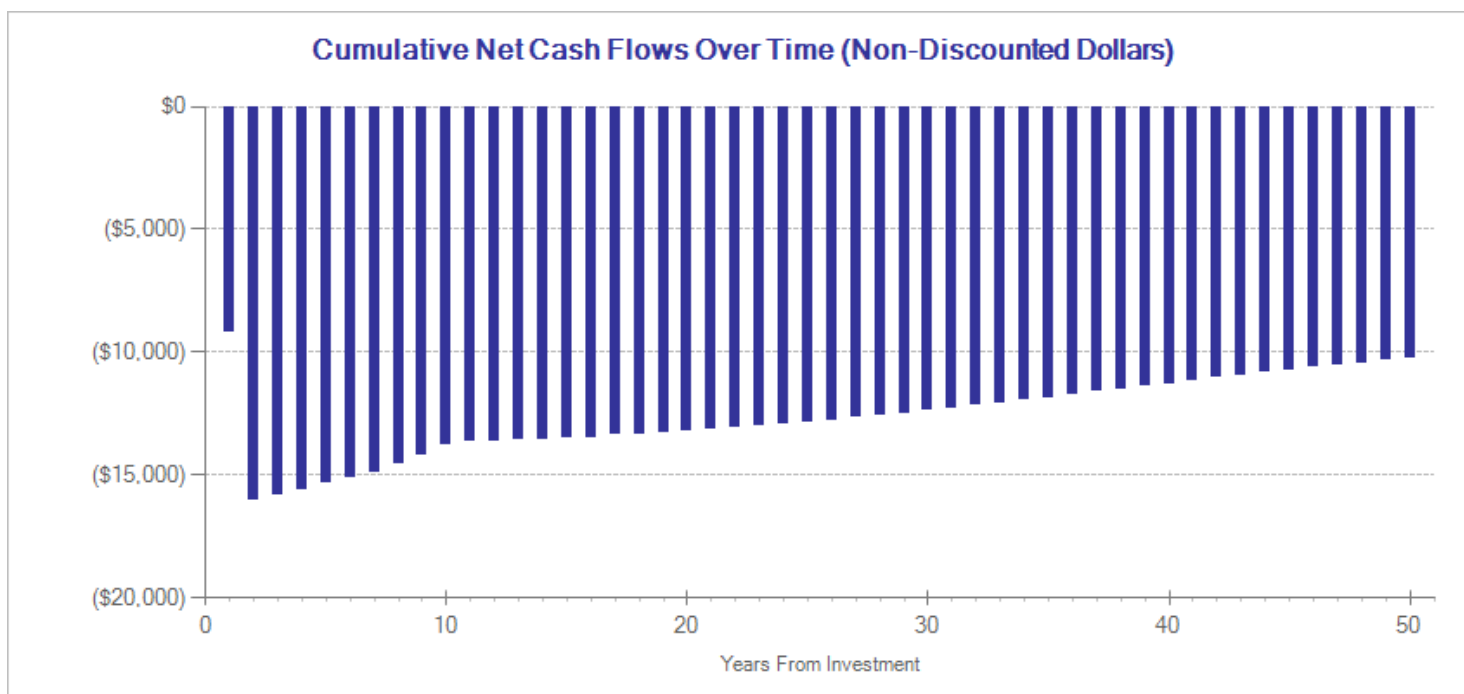| Source of benefits	Benefits to				
	Participants	Taxpayers	Other (1)	Other (2)	Total benefits
From primary participant					
Crime	$0	($3)	($10)	($1)	($14)
Labor market earnings (test scores)	$383	$163	$190	$0	$735
K-12 grade repetition	$0	$25	$0	$13	$37
K-12 special education	$0	$263	$0	$133	$396
Health care (disruptive behavior disorder)	$2	$7	$8	$3	$20
Subtotals	$385	$454	$188	$148	$1,174
From secondary participant					
Labor market earnings (major depression)	$468	$200	$0	$0	$668
Health care (major depression)	$23	$72	$89	$36	$219
Public assistance	($750)	$2,377	$0	$0	$1,627
Subtotals	($258)	$2,648	$89	$36	$2,515
Adjustment for deadweight cost of program	$0	$0	$0	($5,414)	($5,414)
Totals	$126	$3,103	$277	($5,231)	($1,725)

We created the two "other" categories to report results that do not fit neatly in the "participant" or "taxpayer" perspectives. In the "Other (1)" category we include the benefits of reductions in crime victimization and the economic spillover benefits of improvement in human capital outcomes. In the "Other (2)" category we include estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Cost Estimates

	Annual cost	Program duration	Year dollars	Summary statistics	
Program costs	$7,600	1.75	2010	Present value of net program costs (in 2013 dollars)	($10,767)
Comparison costs	$1,679	1.75	2010	Uncertainty (+ or - %)	10 %

U.S. Department of Health and Human Services, Administration for Children & Families, http://www.acf.hhs.gov/programs/ohs/about/fy2010.html.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta analysis. The uncertainty range is used in Monte Carlo risk analysis, described in our technical documentation.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Internalizing symptoms	Primary	1	-0.052	0.682	-0.052	0.127	10	-0.038	0.100	12
Externalizing behavior symptoms	Primary	1	-0.038	0.766	-0.038	0.127	10	-0.018	0.066	13
Test scores	Primary	1	0.011	0.827	0.011	0.052	10	0.007	0.057	17
Crime	Primary	1	0.000	0.999	0.000	0.127	10	0.000	0.127	20
K-12 grade repetition	Primary	1	-0.041	0.854	-0.041	0.224	10	-0.041	0.224	17
K-12 special education	Primary	1	-0.093	0.654	-0.093	0.208	10	-0.093	0.208	17
Years of education	Secondary	1	0.000	0.999	0.000	0.127	29	0.000	0.127	39
Earnings	Secondary	1	0.020	0.872	0.020	0.127	29	0.020	0.127	39
Employment	Secondary	1	0.000	0.999	0.000	0.127	29	0.000	0.127	39
Public assistance	Secondary	1	-0.073	0.634	-0.073	0.154	29	-0.073	0.154	39
Major depressive disorder	Secondary	1	-0.045	0.722	-0.045	0.127	29	-0.023	0.156	31
Substance abuse	Secondary	1	-0.008	0.976	-0.008	0.285	29	-0.008	0.285	39
High school grad via test scores	Primary	n/a	n/a	n/a	0.002	0.018	17	0.002	0.018	17

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Pre-K and elementary bilingual instruction for English language learners
Literature review updated July 2014.

Program Description: Bilingual instructional programs provide English language learner (ELL) students with instruction partially in their native language and partially in English. The evaluations included in this analysis compare programs that use bilingual instruction to those in which instruction is conducted entirely in English, such as English as a Second Language (ESL) or "sheltered" English. The results suggest that the language of instruction does not matter; there is no statistically significant difference in reading test scores between the two general types of programs.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	23	-0.001	0.937	-0.003	0.014	7	-0.003	0.014	17
High school grad via test scores	Primary	n/a	n/a	n/a	-0.001	0.004	18	-0.001	0.004	18

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Charter schools: urban charter schools
Literature review updated August 2013.

Program Description: Charter schools have traditionally been located in cities; many are designed to serve minority students in high-poverty areas. A body of literature suggests that charter schools located in urban areas may be more effective than charters located outside of the urban core. The studies we use in this analysis included findings from specific cities (e.g. New York or Chicago), as well as statewide studies that examine impacts by urbanicity. The studies included a mix of lottery-based, fixed-effect, and matched comparison designs. While this meta-analysis does not identify the reasons for urban charter school successes, we do find that charter schools located in urban areas show more consistent and, on average, positive impacts on reading and especially math test scores, in comparison with our findings for charter schools in general. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	38	0.032	0.042	0.032	0.016	12	0.025	0.018	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.007	0.005	18	0.007	0.005	18

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Charter schools: overall impact

Literature review updated August 2013.

Program Description: Do charter schools impact student achievement? A charter school is a public school governed under a legislative contract or state charter with state or local jurisdiction. Charter schools gain autonomy through exemptions from "selected state or local rules and regulations" and in return "must meet the accountability standards articulated in its charter." In the 2012-13 school year, an estimated 6,000 charter schools enrolled more than 2.3 million students across the country. The studies included in this meta-analysis use a variety of research designs and statistical approaches to measure impacts on student outcomes. The evidence is mixed (some positive, some negative), suggesting that charter schools do not, as a group, have a consistent impact on student test scores. Our analysis was unable to conclude which characteristics of charter schools are associated with more positive outcomes, because specific school characteristics are not commonly measured across studies. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	65	0.003	0.684	0.003	0.007	12	0.002	0.008	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.001	0.002	18	0.001	0.002	18

Citations Used in the Meta-Analysis

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Principal quality

Literature review updated August 2013.

Program Description: Do school principals directly affect student academic outcomes? The studies in this analysis use a "fixed effects" statistical approach to examine variation in principal quality. The studies focus on principals that move from one school to another; impacts on student outcomes can be estimated for different principals in the same school. The estimates represent the impact on test scores from a principal who is one standard deviation above average principal effectiveness.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	6	0.073	0.004	0.073	0.025	11	0.053	0.028	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.014	0.008	17	0.014	0.008	17

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Project Lead The Way (PLTW)

Literature review updated August 2013.

Program Description: Project Lead the Way (PLTW) is an example of project-based learning focused on science, technology, engineering, and mathematics (STEM) education. PLTW is a nonprofit organization that develops engineering courses for high schools and middle schools and biomedical sciences courses for high schools. The curriculum is delivered through an online "virtual academy." Computer software and classroom materials for hands-on activities, as well as required teacher training, are the main costs related to the program. The evidence suggests that PLTW has no consistent impact on student test score outcomes, although the average impact for math is positive. We present the findings for math scores here.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	4	0.097	0.062	0.097	0.052	16	0.093	0.057	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.025	0.015	17	0.025	0.015	17

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Charter schools: Knowledge Is Power Program (KIPP)
Literature review updated August 2013.

Program Description: The Knowledge is Power Program (KIPP) is a network of public charter schools serving more than 41,000 students in 20 states and the District of Columbia. The schools predominantly enroll low-income and minority students. The studies included in this analysis are of KIPP middle schools around the country. Three studies report outcomes for individual KIPP schools, while the fourth study uses the average impact of 41 schools from 14 states. One study uses a lottery-based research approach; the three other studies used a matched comparison design. The evidence suggests that KIPP charter schools improve test scores in both reading and math more consistently than charter schools in general. We present the findings for reading scores here.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	9	0.106	0.028	0.106	0.048	11	0.076	0.053	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.020	0.014	17	0.020	0.014	17

Citations Used in the Meta-Analysis

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Teacher in-subject graduate degrees

Literature review updated April 2012.

Program Description: This analysis examines the impact of having a teacher with a graduate degree in the subject that they teach (e.g., a math teacher with a graduate degree in mathematics), versus having a teacher without a graduate degree, holding all other measured school, teacher, and student characteristics equal.

Meta-Analysis of Program Effects										
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	7	0.023	0.144	0.023	0.016	11	0.017	0.018	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.004	0.005	17	0.004	0.005	17

Citations Used in the Meta-Analysis

Aaronson, D., Barrow, L., & Sander, W. (2007). Teachers and student achievement in the Chicago public high schools. *Journal of LaborE conomics, 25*(1), 95-135.

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Teacher experience

Literature review updated April 2012.

Program Description: We performed an analysis of improvements in student test scores by teacher's years of experience, in comparison with a beginning teacher. This estimate represents the average annual gain in the first five years of teaching.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	53	0.063	0.001	0.060	0.005	11	0.043	0.006	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.011	0.002	17	0.011	0.002	17

Citations Used in the Meta-Analysis

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Archibald, S. (2006). Narrowing in on educational resources that do affect student achievement. *Peabody Journal of Education, 81*(4), 23-42.

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Charter schools: non-urban charter schools
Literature review updated August 2013.

Program Description: While charter schools traditionally operate in urban areas, there is a growing interest in charters located outside of central cities. A few recent studies have begun to examine the impact of charters located outside of urban areas. The effect sizes used in this analysis include only studies that conducted subgroup analysis to examine the impacts of charter schools located outside of urban areas. The effect sizes from the CREDO studies used in this analysis are weighted averages of the impacts of "suburban," "rural," and "town" charter schools. The evidence suggests that charter schools located outside of urban areas have no consistent impact on student test scores. We present the findings for reading scores here.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	10	0.048	0.174	0.048	0.174	11	0.035	0.191	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.010	0.050	18	0.010	0.050	18

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Teacher graduate degrees

Literature review updated April 2012.

Program Description: This analysis examines the impact of having a teacher with a graduate degree, versus having a teacher without a graduate degree, holding all other measured school, teacher, and student characteristics equal.

			Meta-Analysis of Program Effects							
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	31	-0.002	0.209	-0.002	0.001	11	-0.001	0.001	17
High school grad via test scores	Primary	n/a	n/a	n/a	0.000	0.000	17	0.000	0.000	17

Citations Used in the Meta-Analysis

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Leak, J.A., & Farkas, G. (2011). *Effects of teacher credentials, coursework, and certification on student achievement in math and reading in kindergarten: An ECLS-K study.* Evanston, IL: Society for Research on Educational Effectiveness.

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Rockoff, J.E., Jacob, B.A., Kane, T.J., & Staiger, D.O. (2011). Can you recognize an effective teacher when you recruit one? *Education Finance and Policy, 6*(1), 43-74.

Model early childhood education programs
Literature review updated December 2013.

Program Description: Pre-kindergarten programs administered by researchers including demonstration and pilot programs such as Abecedarian and Perry Preschool.

Meta-Analysis of Program Effects									
Outcomes measured	Primary or secondary participant	No. of effect sizes	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
					First time ES is estimated			Second time ES is estimated		
			ES	p-value	ES	SE	Age	ES	SE	Age
Test scores	Primary	2	0.636	0.003	0.636	0.216	4	0.049	0.017	17
K-12 grade repetition	Primary	3	-0.463	0.067	-0.463	0.253	17	-0.463	0.253	17
K-12 special education	Primary	3	-0.470	0.074	-0.470	0.263	17	-0.470	0.263	17
High school graduation	Primary	3	0.314	0.237	0.314	0.265	18	0.314	0.027	18
Crime	Primary	2	-0.322	0.132	-0.322	0.214	29	-0.322	0.214	39
Teen births under age 18	Primary	2	-0.441	0.265	-0.441	0.395	17	-0.441	0.395	17
Teen births (second generation)	Secondary	2	-0.441	0.265	-0.441	0.395	17	-0.441	0.395	17

Citations Used in the Meta-Analysis

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